Inventors DIGEST

MAY 2017 Volume 33 Issue 05

STEM MISSION

IPOEF Innovator Insights:
GIRLS SCHOOL GROWS LEADERS

U.S. Loses Top Patents Ranking
FALL TO 10TH PLACE REFLECTS
RECENT RULINGS, UNCERTAINTY

Tech Triumphs of 1998
HISTORIC INNOVATIONS
HAVE AN ENDURING IMPACT

A Good Trash Talking
GARBAGE CAN SMART DEVICE
HELPS BUILD GROCERY LISTS

NATIONAL INVENTORS MONTH

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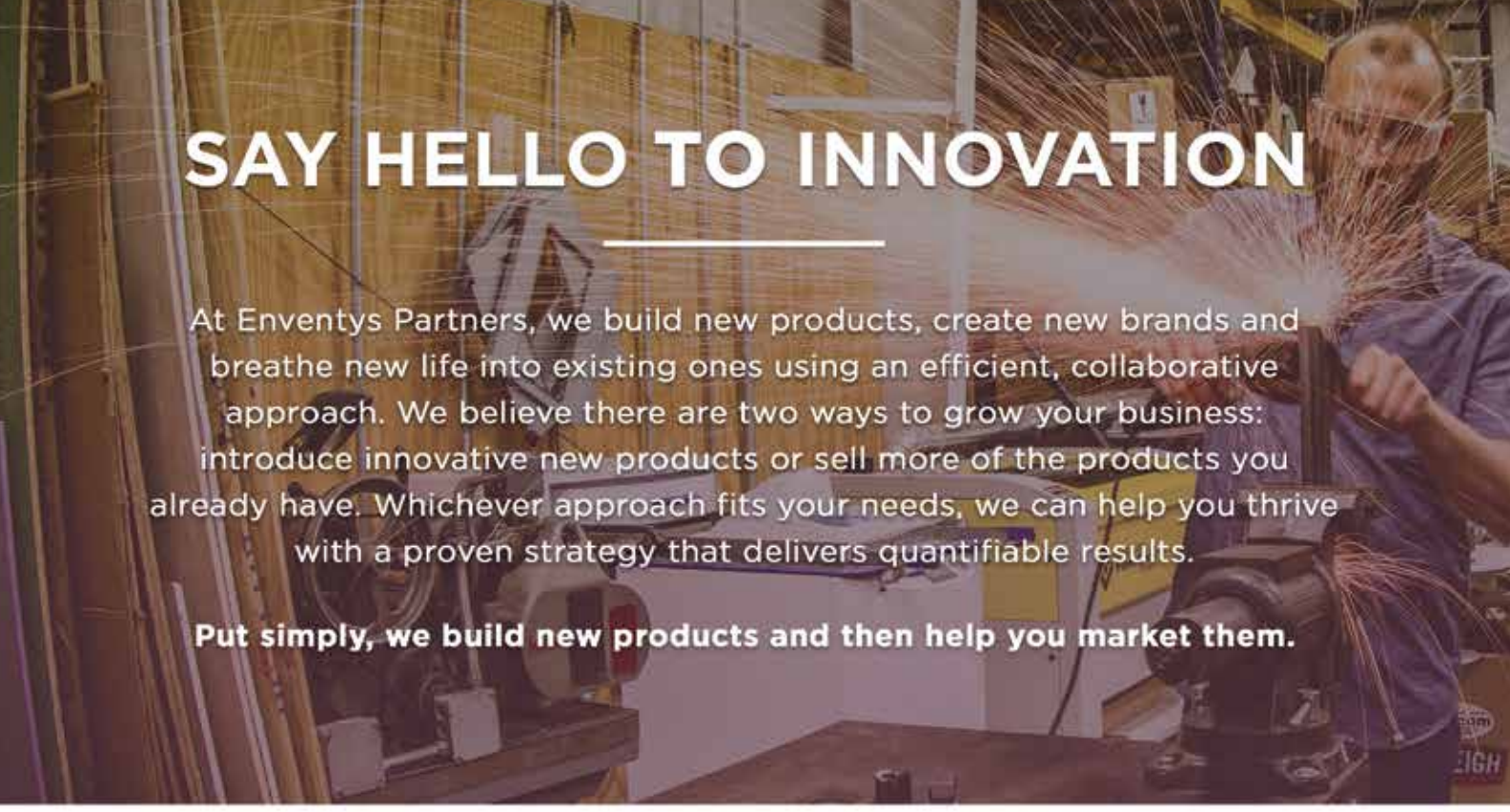

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A Month to Celebrate Innovation

In an industry that defies convention, it's fitting that we celebrate inventors at an august occasion every May.

The National Inventors Hall of Fame will honor its 15 2017 inductees on May 4 during a black-tie dinner and awards ceremony—billed as the Greatest Celebration of American Innovation—at the National Building Museum in Washington, D.C. The honorees are from widely diverse fields and eras.

They include: Iver Anderson, who invented a lead-free solder; Donald Arney, for the Bambi Bucket for aerial firefighting; Carolyn Bertozzi, for her work in bioorthogonal chemistry; Eli Harari, Floating Gate EEPROM (flash memory); Marshall Jones, for his innovation in industrial lasers; Frances Ligler, portable optical biosensors; Tom Leighton and Daniel Lewin, for an internet content delivery network; Earle Dickson, the Band-Aid; Harold (Bud) Froehlich, the Alvin Deep-Sea Submersible; Haren Gandhi, for his work with automotive exhaust catalysts; Howard Head, for his redesign of downhill skis and tennis rackets; Beatrice Hicks, for a device that senses gas density; Allene Jeanes, dextran production and xanthan gum; and Augustine Sackett, for drywall.

It's also fitting that the celebration will come during National Inventors Month. May received that designation in 1998, courtesy of the United Inventors Association of the USA (UIA-USA), the Academy of Applied Science—and *Inventors Digest*. Joanne Hayes-Rines, *ID*'s editor from 1987 to 2007 (and who was profiled in our cover story last November), said: "We want to recognize those talented, brave individuals who dare to be blatantly creative, and therefore different, and whose accomplishments affect every facet of our lives."

We strive to continue that recognition every month on these pages. Join us in celebrating the talented, the brave and the creative minds of the past and present, and honoring more of that excellence in the future. *—Reid*

(reid.creager@inventorsdigest.com)

BUT WAIT! There's More

The newly revamped *Inventors Digest* website (inventorsdigest.com) has been an instant hit with readers. Not only does it highlight content from the print publication and offer helpful links for inventors, it includes extra content that is exclusive to the website. (We delay posting the latest edition to reward our subscribers.)

ID webmaster Vincent Ammirato notes that the site has expanded the number of articles online while continuing to add articles from past issues; improved the commenting system to encourage interaction; and added new Resource pages. An even newer version of the site, to be rolled out soon, will mimic the print version of the magazine; include enhanced features for paid subscribers; and introduce a store to sell back issues and other *ID*-related products. InventorsDigest.com is updated frequently, so remember to check us out regularly.

INGENUITY IS AMERICA'S MOST VALUABLE RESOURCE.

DON'T TREAT IT LIKE A CHEAP COMMODITY.

Our strong patent system has kept America the leader in innovation for over 200 years. Efforts to weaken the system will undermine our inventors who rely on patents to protect their intellectual property and fund their research and development. Weaker patents means fewer ideas brought to market, fewer jobs and a weaker economy. We can't maintain our global competitive edge by detouring American innovation.

SAVE THE AMERICAN INVENTOR

TAKE ACTION AT SAVETHEINVENTOR.COM

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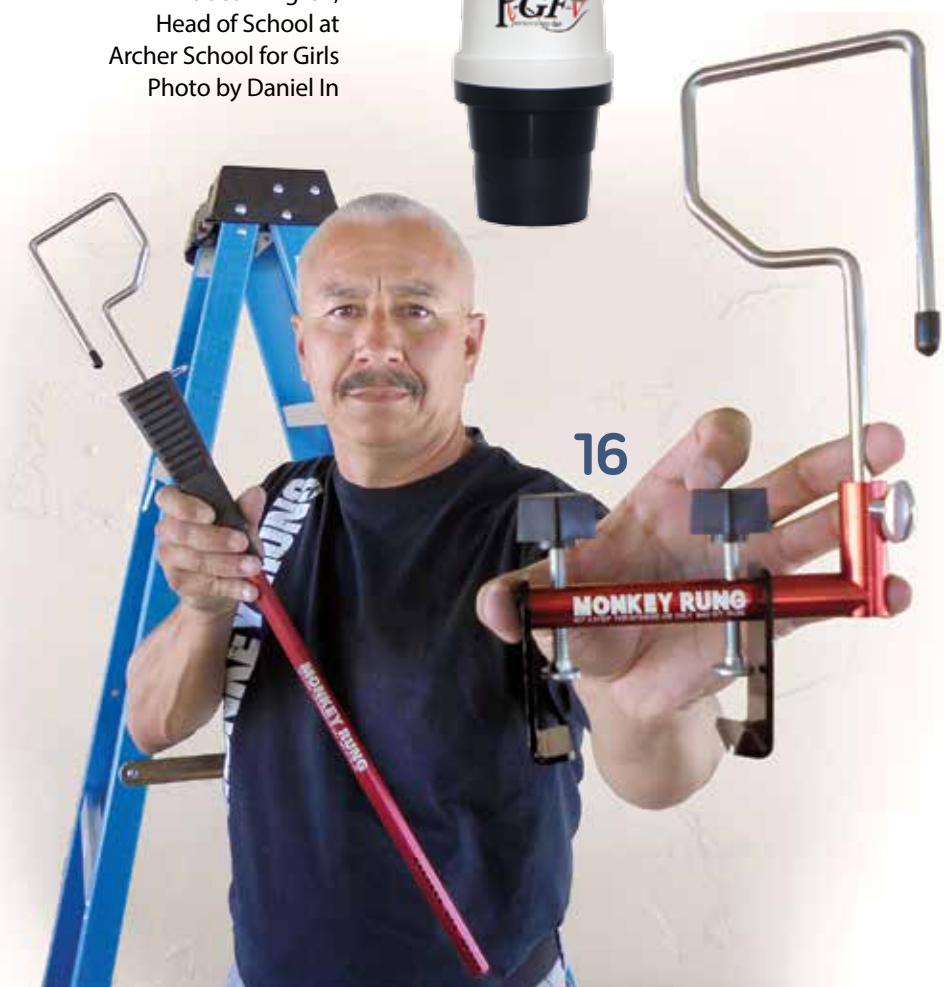

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BRIGHT IDEAS

AdapDesk

PORTABLE WORK STATION

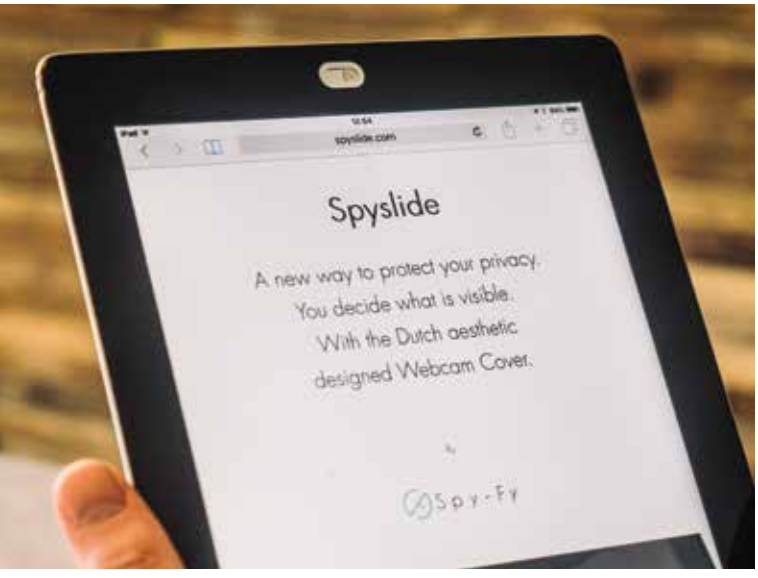
Adapdesk.com

Billed as the world's first portable work station, AdapDesk was made to help users take full advantage of laptop computers' portability.

The wooden desk, which can be folded for storage and transport, features a laptop surface and retainer that you can angle to suit most positions—from sitting at a desk to lying in bed. The AdapDesk also includes a mousepad holder, side baskets and a cup holder.

AdapDesk comes in two editions. The Fully Foldable edition (suggested retail price of $160) folds to 11.75" x 12.75" x 3.75", so it fits inside most backpack and laptop briefcases. The Standard edition ($135) folds to 12.75" x 23.5" x 2" for easy storage.

The estimated shipping timeframe is November.



Spyslide

EASY, ATTRACTIVE LAPTOP WEBCAM PROTECTION

spy-fy.com

The Spyslide provides a pretty simple solution to an ugly annoyance: those stickers affixed to laptop webcams to prevent spying. Now you can cover your webcam by sliding it open and closed.

Advertised as the world's thinnest webcam cover (0.6mm), the Spyslide is thin enough to close a Macbook Air and comports with the design of your device. You can install the cover—layered in a matte black or metallic silver coating and made from platinum durable stainless steel—in 5 seconds.

The cover is suitable for most smartphones, depending on their shape and size. The Netherlands-based company is offering a retail price of 10€ (or about $10.75 U.S.). Shipping was scheduled to begin in May.

Sky Shelves

CUSTOMIZABLE MAGNETIC SHELVES

Skyshelves.com

Sky Shelves allow you to customize any living space to eliminate clutter and better organize the space around you. They require no screws and no tools.

Ideal for kitchens, counters, cupboards and drawers, the shelving pieces can be used separately or stacked atop one another. Increase or decrease the height of the shelves by inserting the number of legs you want. Silicon shoes that are placed in the corner of the boards activate a strong magnetic field to provide support and stability.

Sky Shelves are waterproof and durable, with a sleek finish, anti-scratch surface and anti-skid shoes. Simply Shelves, a more cost-efficient solution, is ideal for one-level shelves such as in cupboards.

Prices vary, depending on quantities. Shipping is set for August.

"We have to continually be jumping off cliffs and developing our wings on the way down."

—KURT VONNEGUT

MotherBox

TRUE WIRELESS CHARGING

Indiegogo.com

Unlike some other products that claim to wirelessly charge your cellular device, the MotherBox requires no tethering or point-to-point contact. Charge your iOS or Android devices simultaneously and don't worry about charging cables anymore.

The Motherbox charges your battery through a thin receiver that plugs into the power port on your smartphone. You then download the app and connect the chargers. The MotherBox must be connected to an outlet; the MotherBox Mini has a rechargeable battery and can be used on the go. A USB cable and receiver are included with each product.

The MotherBox Mini sends push notifications when its battery is running low and allows you to set preferences for when you want to charge. Like the MotherBox, it has no hindrance from barriers and no contact required.

The MotherBox comes in desk and portable sizes for different demands. Early-bird prices were as low as $79; shipping is to start in September.

Windows 98 and the iMac had technological impacts that are still felt today.

A Time of Tech Triumphs

HISTORIC INNOVATION HIGHLIGHTED 1998, THE YEAR MAY WAS NAMED NATIONAL INVENTORS MONTH **BY REID CREAGER**

We thought we were so technologically sophisticated just a couple of decades ago, when social media meant journalists who like to have a good time.

As the world was counting down to Y2K with anticipation and angst in the late 1990s, most of us were connecting to this new-fangled internet thing via the primitive buzzing known as dial-up. Words such as "texting," "app" and "hashtag" were still years from becoming a part of our everyday language. People weren't shutting off the world around them just to stare or type into a tablet-sized device in their hands.

In 1998, May was designated National Inventors Month. The annual observation was started by the United Inventors Association of the USA (UIA-USA), the Academy of Applied Science and Inventors Digest, which was already 13 years old.

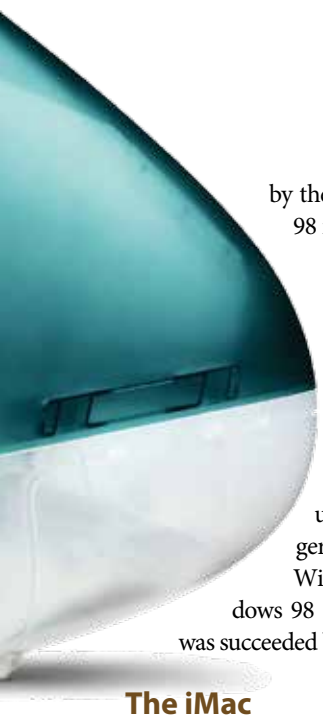
President Bill Clinton's impeachment over the Monica Lewinsky affair wasn't the only history made in 1998. Here's a look at some high-tech invention milestones in the same year that 76.3 million people tuned in for the final episode of "Seinfeld."

Windows 98

The graphical operating system by Microsoft—code-named Memphis while in development—quickly became as ubiquitous on PCs as its predecessor, Windows 95. Though Microsoft referred to Windows 98 as merely a fine-tuning of Windows 95, the upgrade marked the first time a user could use a web browser as the computer's standard command system. "The most noticeable change is that Windows 98 blurs the distinction between information that resides on a local hard disk and information that exists on the internet," the New York Times reported.

As part of this, Windows 98 introduced the Back and Forward navigation buttons and the address bar in Windows Explorer, among other things. It introduced Internet Explorer 4, Outlook Express, Windows Address Book and Microsoft Chat.

Windows 98 also featured automated links for getting updated Windows tools from the Microsoft website, as well as significantly reducing the time it took to load complex applications such as Adobe Photoshop. An estimated 90 percent to 95 percent of all new PCs sold



by the end of 1998 came with Windows 98 installed.

Though the system brought the usual scattered complaints and challenges from users, it was largely popular. Because 27 percent of Google's page views were on Windows 98 systems as late as October-November 2003, Microsoft maintained extended support for 98 until July 11, 2006—30 months longer than originally planned.

Windows 98 was followed by Windows 98 Second Edition in May 1999. That was succeeded by Windows ME in June 2000.

The iMac

Billed as Apple's desktop computer for the new millennium, the iMac's many impacts have ranged from practical to economic to cultural.

The iMac's popularity began the long-running PC/Macintosh debate: Which is better? There's no definitive answer, of course; because the Mac runs on an OS X operating system and PCs run on Windows, they "think" differently, so the best computer is a matter of personal preference.

The $1,299 retail price that accompanied the gumdrop-shaped iMac G3's first shipping in August 1998 established Macs as much pricier than PCs, though that gap has narrowed through the years. The iMac was the first Macintosh to be designed with the internet in mind, making it Apple's most important consumer-market computer since the Macintosh 128K debuted in 1984.

Most significant for Apple was how the iMac turned around a company that had been reeling since the mid-1990s. Apple lost a reported $878 million in 1997 but made $414 million the following year.

The iMac helped change the way our tech-happy world communicates. The small "i" prefix started an Apple branding trend that led to countless successors—the iPod, iPhone, iChat, iLife, iSight, etc. iMac also introduced the ever-present USB port and meant the end of the floppy drive.

The initial egg-shaped 1998 iMac was quickly updated with a sleeker design that enabled the computer's slot-loaded optical drive. Many other revisions have continued since. Apple officials recently confirmed plans for the release of newer models later this

INVENTOR ARCHIVES: May

MAY 5, 1809

Mary Dixon Kies was granted a patent for a new method of weaving straw with silk or thread to make hats. Many sources say it was the first U.S. patent ever awarded to a woman.

Kies' innovation was a boon to the economy at a crucial time. President Thomas Jefferson's 1807 trade embargo resulted in U.S. exports dropping from a reported $108 million in 1807 to $22 million the next year. Her invention became a fashion fad and powered the growing straw hat industry. The patent was signed by President James Madison in 1809, and she received a letter of appreciation from first lady Dolley Madison.

The patent was destroyed in a fire at the U.S. Patent Office in Washington, D.C., in 1836. The following year, she died and was buried in a pauper's grave in Brooklyn, N.Y. In 1965, a monument was erected in her honor in her native South Killingly, Connecticut. Kies was inducted into the National Inventors Hall of Fame in 2006.

MAY 22, 1906

Orville and Wilbur Wright received a patent for a "Flying Machine" with a motor, almost three years after their historic 12-second flight at Kitty Hawk in North Carolina. Last year, U.S. Patent No. 821,393 was returned to the National Archives after its file had been misplaced for almost four decades.

According to livescience.com, in 1978 the National Archives lent the patent to the Smithsonian Institution's National Air and Space Museum in connection with an exhibit to honor the 75th anniversary of the Kitty Hawk flight. Although archivists marked the documents as returned in 1980, a later search could not locate them.

A National Archives representative said last year that the patent had been filed in the wrong box and that the folder with the missing documents was found in a National Archives storage area in Lenaxa, Kansas. Among items still missing are the patent drawing for Eli Whitney's cotton gin and some NASA photographs from the moon.

MAY 8, 1942

"White Christmas" was registered by Irving Berlin. The iconic song is said to be the most valuable music copyright in the world.

Guinness World Records says the version sung by Bing Crosby is the best-selling single of all time, with estimated sales of more than 100 million copies worldwide. Other versions have sold more than 150 million copies. Crosby recorded the song with the John Scott Trotter Orchestra and the Ken Darby Singers and Chorus for Decca Records in 18 minutes on May 29, 1942.

The first verse of "White Christmas" has been left out of mainstream recordings so frequently that many don't know it exists. Berlin was in either California or Arizona when he wrote it:

The sun is shining, the grass is green/ The orange and palm trees sway./There's never been such a day/in Beverly Hills, L.A./But it's December the twenty-fourth/ And I'm longing to be up North.

year; the site macrumors.com said in early April that these offerings will likely be geared even more toward the professional market.

The MP3 player

Determining the beginnings of the MP3 player gets a little contentious, depending on which source you find most trustworthy. But many agree that the first commercially released personal music player capable of handling MP3 files was the MPMan F10, introduced by SaeHan Information Systems in Korea in March 1998. It sold for $250 and had only 32 megabytes of memory—although for another $69, you could upgrade to 64MB. Still, that only allowed for a maximum of about 20 songs.

The Rio PMP300, introduced six months later by Diamond Multimedia, also came with just 32MB of storage. But in part because it had a larger display than the MPMan and a Smart Media slot to allow increased storage capacity, it was the first MP3 player to enjoy commercial success.

The iPod had much greater success than the Rio PMP300, due to its considerably larger storage capacity and other refinements.

The Rio quickly ran into legal trouble. Having teamed with MP3.com to offer songs from that website, Diamond's subsidiary company RioPort was sued by the Recording Industry Association of America, which claimed the player violated terms of the 1992 U.S. Home Recordings Act. The RIAA claimed that if people ripped CDs and turned audio tracks into digital files, it would lead to music piracy. The dispute was settled the following year.

Many mistakenly think that the iPod, launched by Apple in September 2001, was the first MP3 player to hit the market. That's probably due to the device's instant success. A thin white box no bigger than a deck of playing cards, the iPod held 5 gigabytes of music storage and became an iconic tech staple.

A British furniture salesman, Kane Kramer, beat everyone to the punch as far as inventing the first digital music player, when he was 23 in 1979. Apple even used his notes and sketches during a separate 2008 court case. Kramer had secured a worldwide patent for his IXL device but could not afford to renew it, so it expired in 1998.

Google is incorporated

One of the most important events in technological and economic history came in a Menlo Park, California, garage on Sept. 4, 1998. Sergey Brin, whose family escaped Russia to avoid Jewish persecution in 1979, formally incorporated the company Google Inc. with his partner, Michigan-born co-founder Larry Page. The two rented the garage from a friend for $1,700 a month, according to the book "The Story of Google" by Sara Gilbert.

Page and Brin met while attending Stanford University, where they began to collaborate on a search engine called BackRub. The name they ultimately chose for the world's most famous search engine is the result of an accidental misspelling of the word "googol" by one of Page's associates, although details of that account vary.

The term "googol" was coined in 1920 by 9-year-old Milton Sirotta, the nephew of U.S. mathematician Edward Kasner. In decimal notation, googol is written as the digit 1 followed by one hundred 0, or 10 to the one hundredth power. As for the events that led to the misspelling, we'll go with the account by David Koller, based on information he got from friends and colleagues in the Gates Computer Science Building at Stanford. Koller wrote:

"Larry's office was in room 360 of the Gates CS Building, which he shared with several other graduate students, including Sean Anderson, Tamara Munzner, and Lucas Pereira. In 1997, Larry and his officemates discussed a number of possible new names for the rapidly improving search technology. Sean recalls the final brainstorming session as occurring one day during September of that year.

"Sean and Larry were in their office, using the whiteboard, trying to think up a good name—something that related to the indexing of an immense amount of data. Sean verbally suggested the word

Apple's iPod was launched three years after the first commercially released personal music player capable of handling MP3 files, and 22 years after the first digital music player.

IPODHISTORY.COM; MUSEUMOFINTELLECTUALPROPERTY.ORG; ©PAUL SAKUMA/ASSOCIATED PRESS

Google co-founders Sergey Brin and Larry Page address the media in 2008, when Google's net income surpassed $4 billion.

'googolplex,' and Larry responded verbally with the shortened form, 'googol.'

"Sean was seated at his computer terminal, so he executed a search of the Internet domain name registry database to see if the newly suggested name was still available for registration and use. Sean is not an infallible speller, and he made the mistake of searching for the name spelled as 'google.com,' which he found to be available. Larry liked the name, and within hours he took the step of registering the name 'google.com' for himself and Sergey (the domain name registration record dates from September 15, 1997)."

Fate was not the only force that suggested Page and Brin had a winner. By the end of 1998, Google had an index of about 60 million pages. As of late 2015, it had indexed more than 100 billion pages with apps; now there are more than 100 billion Google searches every month.

Don't Ignore This 4-Letter Word

RISK IS A CRUCIAL CONSIDERATION FOR ALL INVENTORS **BY JOHN G. RAU**

Inventors seek patent protection for many reasons. There is the fear that others might steal their idea; personal credibility or vanity; for the experience; the potential to make money from the patented new product; and perhaps because someone told them they should do it.

But as with many other endeavors, it's imperative to consider the risk factor. Sean Butner addressed this in his chron.com article, "What Risk Does an Inventor Assume When Filing for a Patent for an Invention?" Good question! On the other hand, what risks does an inventor assume if he or she doesn't file for a patent? Let's address these questions separately.

Keep in mind that few inventions ever make it to the marketplace, patented or not. And although a patent can provide valuable protection for a successful invention, getting a patent doesn't necessarily increase the chance of commercial success.

Remember that a patent only gives you the right to exclude others from making, using, offering for sale, or selling an invention in exchange for disclosing your invention to the public. Having a patent is not a requirement for you to make or sell your invention, but it does provide you with legal ownership of your idea for a limited period. Thus, you own some form of intellectual property that is potentially marketable.

Timing is an issue in seeking protection via a patent. Remember that the United States uses a "first to file" system—meaning that, in general, when two people independently invent something, the first inventor to file an application for a patent on the invention gets the patent, regardless of who came up with the invention first. In this situation, delay is a risk. Waiting to file increases the chances that someone else will independently come up with the same invention you have, file before you, and get a patent on the invention.

Risks if you file

For those who don't wait to file, there are these risks:

- You may find that your invention is not patentable because it fails one or more of the novelty, non-obvious and/or useful tests for utility patents, or perhaps conflicts with significant prior related art. Patentability of an invention is often uncertain in the sense that, if you don't get a denied application, you may get some denied claims that result in a drastically narrowed-down, less useful version of the original application. That is, some of the key claims that you thought were potential discriminators have been denied.
- When you file, the United States Patent and Trademark Office publishes your application 18 months after filing. So you incur the risk of telling the world what you have in mind and, as a result, potential competitors have the opportunity to explore and develop potential competing products—thus entering the marketplace with you. The threat of competition is always a risk.
- Doing it yourself is the most inexpensive way to get a patent, but it is risky without the help of a patent attorney or agent. You should recognize that the "language" of a patent application is what attorneys are familiar with; not using commonly understood terms in this context may

Delay can be a risk. Waiting to file increases the chances that someone else will independently come up with the same invention you have, file before you, and get a patent on the invention.

hurt you. If an inventor doesn't file an application correctly, he or she risks having the application rejected.

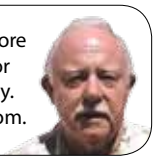
- Inventors filing for a patent take on the risk that the fees they have to pay (attorney or agent plus filing fees) will eventually pay off and be recovered when the invention becomes profitable. There are many reasons this might not pay off: not a big enough market; too much competition; no one wants to buy or license your patented product from you; and you are unable to manufacture and sell it yourself. This is why you should always perform market research to assess whether your idea is economically viable before you start spending money. If it's not worth it, don't do it!
- In his blog at quora.com, patent attorney Russ Krajec says that when you are presenting your new patented invention to a potential buyer, you must convince him or her that it will generate lots of income—but in this regard, there are two major risks. First is the technology risk, which includes whether the invention actually works, as well as whether the product can be manufactured with plenty of margin to make a profit. Second, you have to address the market risk, which includes whether someone would buy it and how much he or she would be willing to pay.
- As a result of the America Invents Act, once a patent is awarded, any third party can challenge it for up to nine months after the patent is granted. By filing a patent, an inventor takes on the risk of incurring unexpected legal costs from these post-grant oppositions.

Risks if you don't file

- Unless you have established some type of legal ownership (not counting trademarks or copyrights) of your new product, it will be difficult to sell it or license it.
- Without some type of intellectual property protection (i.e., IP rights), competitors could take advantage of your invention. If the product is successful, competitors may be tempted to make the same product by using your invention without having to pay for such use.
- If you decide to manufacture and sell your new product by yourself, you run the risk of infringing on someone else's patent(s) unless you perform some type of initial patent search. You should always check this before entering the marketplace. Even if you came up with the idea independently, someone may already have something identical (or close enough in protected features and/or functions) in the marketplace that he or she already has patented.
- If you have a new product idea that is more of a novelty or seasonal fad item with probably a market life of less than three years, the general consensus is to not waste time and money to get a patent because it probably won't issue until after the product life has expired. In this case, go make your money and run!

Whether you patent or not, inventing is all about risk taking. Dean Kamen, best known for inventing the Segway electric scooter, said that in the invention development process, "Taking risks is essential." And a popular business proverb says: "Progress always involves risks. You can't steal second base and keep your foot on first."

John G. Rau, president/CEO of Ultra-Research Inc., has more than 25 years experience conducting market research for ideas, inventions and other forms of intellectual property. He can be reached at (714) 281-0150 or ultraresch@cs.com.



Divide and Conquer

PUT 'OPPORTUNITY SCOUTS' TO WORK FOR YOU, THEN ANALYZE CHANCES FOR INVENTION SUCCESS

BY JACK LANDER

It's easy to discover needs, wants, problems and annoyances that form the basis of our inventions. And it's often easy for us to come up with inventions that satisfy those four criteria. What's difficult is objectively evaluating opportunities from satisfying those criteria and finding the one best for making a profit.

Let's face it. The vast majority of inventions go nowhere. Even those that are novel enough to qualify for a patent usually end up as a nice idea, but with no monetary gain. This is not because we inventors don't create good solutions. It's because circumstances beyond our invention work against us. For example:

- Timing. We're too early or too late.
- It's been done. We've overlooked an existing product or patent.
- Our solution does not appeal to potential licensees.
- Our solution does not appeal to potential sellers or their customers.
- We let our optimism and enthusiasm blind us to the obstacles.

We can learn to overcome all of these impediments, but it is disappointing if we keep rejecting opportunities and never get around to the fun part—inventing. The answer is to work with a large number of opportunities, and sort out the few that meet a high standard for investment of our time and money. Sounds good, but you may not be one of those prodigies who has two good ideas for inventions before breakfast.

Many opportunities for inventions are discovered by ordinary people who do not consider themselves inventors. They stumble on and identify needs, wants, problems and annoyances often, but nothing comes of it because they don't create a solution. Again, most of these opportunities should be analyzed and ruled out. We're panning for gold, and nearly all of the nuggets in our pans are stones.

The answer is to work with a large number of opportunities, and sort out the few that meet a high standard for investment of our time and money.

Plato's idea holds up

Ah, but Plato had an answer for us way back in 380 B.C., which he called the "division of labor." Let those persons who discover opportunities for inventions specialize as scouts, and let the inventors sort out the opportunities and invent solutions. Everybody gains.

Here's how it can work: Print up a few hundred business cards with your contact information and the following statement in large type: "Tell me about serious needs, wants, problems, annoyances, etc. that you discover. We'll share resulting income, if any." I would add the word "inventor" after my name, but you might resist that tag.

Now, pass these out to people with whom you have ongoing contact: your dentist, hairdresser, club and church friends, even your lazy cousin. I've had friends and associates come to me with ideas for inventions many times over the years because they knew I am an inventor. And that happened without any coaxing from me. Imagine the feedback you might get when you expand your circle and ask for ideas.

Still, this plan can be a problem if you don't clarify the conditions and terms that cover the sharing. Here are some points that should be covered in a letter of agreement that both parties should acknowledge.

1. The inventor has no obligation to follow through with a solution or invention if in his/her opinion the need, want, problem, annoyance, etc. presented to him/her would not form the basis for a feasible invention.
2. The inventor may invest his/her time and money in the design, development, protection and marketing of an invention that arises in response to a need, want, problem, annoyance, etc., hereafter referred to as the "opportunity."
3. The presenter of the opportunity, etc. has no financial obligation for, or investment interest in, a resulting invention or solution to the opportunity presented.
4. The inventor will share any profits from a solution or invention that arises in response to the opportunity presented to him/her in the following ratios: 10 percent to the presenter and 90 percent to the inventor, unless another arrangement has been made after the inventor evaluates the opportunity. Standard accounting rules will be applied for the determination of profits. (The percentages are examples only, not intended as fixed.)

Bear in mind that the four points above are only suggestions for an agreement and should not be considered a model agreement. I am not a lawyer and cannot create a document that fully covers all of the points that should be considered. I urge you to have your own agreement prepared by a lawyer. At the very least, if you decide to go ahead with an invention, you should have a lawyer draft an agreement specific to the project.

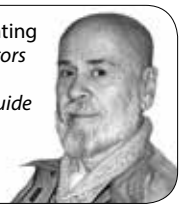
Assess the opportunity

We have to kiss a lot of frogs before the prince or princess appears. But that's our fate as inventors. The key to success is a critical evaluation of an opportunity for an invention, even before we spend money on a patent search or a prototype.

To conclude: Our rate of success depends on eliminating most of the invention opportunities we encounter by being critical and honest about their prospects for earning a profit. That means we might wait years before we discover the one great opportunity that might succeed. The person whose DNA has "inventor" etched in it will find it difficult to be patient. The answer is to multiply our opportunities by enlisting "opportunity scouts."

Now, pardon me while I go kiss a very attractive frog.

Jack Lander, a near legend in the inventing community, has been writing for *Inventors Digest* for 20 years. His latest book is *Marketing Your Invention–A Complete Guide to Licensing, Producing and Selling Your Invention*. You can reach him at jack@Inventor-mentor.com.



His Goal: A New Way to Help Ladder Injuries Fall

ACCIDENT LEADS TO INVENTION OF ATTACHMENT TOOL

BY EDITH G. TOLCHIN

When inventor Lawrence Ayala approached me to write about his line of ladder attachments, I learned a bit about them. One of my first questions was, "Are they safe?"

The most recent statistics I could locate for ladder accidents were more than five years old; however, I believe they would still be fairly close today. According to the Centers for Disease Control and Prevention, "Work-related falls from ladders caused 113 deaths and almost 15,500 non-fatal injuries that resulted in at least one day away from work in 2011."

Ayala learned the hard way about ladder safety. Fortunately, he overcame his on-the-job injuries to create a series of ladder attachment tools called the Monkey Rung® that help workers and anyone who uses a ladder to execute their jobs more safely and efficiently.

Edith G. Tolchin: Did you always have an inventive mind?

Lawrence Ayala: Yes. When I was growing up, my generation didn't have the distractions of advanced technology as we have today. I'd always loved tinkering around with my bike, building a treehouse, and so on. As a kid, I can recall my grandma saying, "Here's a hammer and nails. Go build something." This type of activity carried on into my adulthood.

At age 16, on the weekends I would paint for extra money. This was fun and interesting. I loved the final outcome of taking a house, cabinets and furniture and bringing them back to life. Fast-forward 31 years later and I've painted for some well-known movie actors, professional athletes, inventors and famous artists (in the Guggenheim Museum). I've worked on the restoration of landmark homes and have donated my time to Habit for Humanity.

EGT: When did you experience that first "aha!" moment?

LA: I had a devastating ladder fall in which I pretty much broke the whole left side of my body. After rehabilitating from this accident, I got back into painting.

Once, I was on a 32-foot ladder spraying stain and backrolling the stain into the cedar siding. That day, the winds were gusting and I was scared of falling again. There were too many tools in my hand, so I told my son to go look on the internet and find me an extension ladder accessory. The accessories he showed me were big, bulky and all designed around a tray. I grabbed a (thin) "weenie roller" frame and did some adjusting to the handle so it could fit into the ladder rung. This actually worked; it held the spray gun and paint roller. It freed up one of my hands to hold onto the ladder rung. This was my "aha!" moment! I finished up that wall and left for the day.

EGT: How many Monkey Rung products are there, and what are the various uses for each?

LA: The Monkey Rung offers two products with four interchangeable attachments—and still, four more products are waiting to be designed. The Monkey Grip is designed for all major brands of extension ladders. The tool will be inserted into the ladder rung, and the rubberized grip is form-fitted to the rung. The locking feature will appear on the other side of the rung. You slide the hitch pin clip into the closest hole and lock the Monkey Grip in place.

The Monkey Klamp is designed for all major brands of step A-Frame ladders. The Klamp is installed toward the top of the ladder frame. Tighten the vises, and the product is very secure.

The four interchangeable attachments will assist you in a variety of tasks. There are two more attachments in the process of being designed. Monkey Rung products can be stored on your ladder; just remove the attachment. They are all about safety in helping the consumer achieve three-point contact (either two hands and one foot on the ladder, or one hand and two feet).

EGT: Do you have any patents? If so, tell us about the patent process.

LA: The Monkey Rung is a registered trademark, has two patents pending, and one that has been recently

PHOTOS COURTESY OF LAWRENCE AYALA

The Monkey Rung offers two products with four interchangeable attachments.

"Monkey Rung products can be stored on your ladder; just remove the attachment. They are all about safety in helping the consumer achieve three-point contact."—LAWRENCE AYALA

accepted for the Grip (extension ladder tool). The excitement is overwhelming to achieve this goal on my first patent filing. I would recommend finding a really good patent attorney, and that process took me months. The patent search was the next step. That was interesting, and I received positive feedback. We then proceeded to file a non-provisional and started the same process with the Klamp and the attachments. I can say this is a lengthy process, so pack your patience.

EGT: Where are you manufacturing?
LA: To find the right manufacturer for my tools was very difficult. I had to find a plastic injection company, a fabrication shop, an anodizing and laser etching company. The person-to-person contact was a real plus at the beginning of the design stages.

I started the manufacturing here in the United States but could never get my prices low enough for the consumer. We did have sales and had several interested stores, but the fabrication prices increased steadily. I later had contact with a company to get pricing in China and received several prototypes. The price differences were mind-blowing, but if you want to get into the big-box stores you have to meet certain price points. I was really bummed about going overseas, but consumers want lower prices.

EGT: What about product safety issues?
LA: The idea was to use the most durable material on the market. The 5/8ths solid aluminum rod is used in

both tools. The anodizing of the tools will prevent electrical current. The form-fitted rubberized grip is made from 90 durometer rubber. Then there's the strength of the stainless steel attachments. The Klamp and the Grip will lock onto your ladders very securely. The bigger base of a step A-Frame (ladder) or the larger extension ladders will hold heavier weights.

I've been working on ladders for 30 years, and the average weight of tools, paint in a bucket, tool bags, etc., being used on a ladder is around 4 lbs. to 8 lbs. The DIYer, tradesman or woman doesn't usually carry up that much weight when performing a task. The whole idea was to develop the safest, most durable and simplest ladder accessories on the market. Ladder (injury) statistics are high, so please use common sense and be safe.

Attachments (top to bottom): Universal Holder, Bucket Holder, Tool Holder and Bag Holder.

EGT: How is your product packaged? Did you work with a graphic artist or packaging designer?

LA: The Monkey Grip and Klamp, along with the attachments, was a challenge for packaging. I used a graphic designer, and we decided on flat cardboard packaging. The products would be zip-tied to the flats, and this was the least expensive packaging.

Also at that time, I was working with a company interested in the Monkey Rung, and their package designer submitted a mock package to me. They used the cardboard box with pictures of the Klamp in use, with the fading colors of blue. The background colors made the product and logo really pop. It also showed several pictures (in bubbles) with the tools in use.

EGT: Are you selling to retail or just on your website for now?

LA: This is a very hard question for me right now, as I'm not selling in retail or on the website. The manufacturing company that I had been using to develop the products is no longer located in Arizona (where I live). Long story, short: My mother passed away from breast cancer. When I got back into town, I found out through another client that the manufacturing company's house was already in escrow, so they sold the shop. I still don't know the full story. I received one text message saying, "Do you still want these attachments?" I replied, "No, because they were inadequate." I haven't heard from the manufacturer since. We had stores, a catalog and individuals ready for sales. As a result, I am currently open to all offers for manufacturing or licensing.

EGT: Have you encountered any obstacles in developing your products?

LA: The entire process is very challenging when developing a product, starting from when the light bulb goes off in your head. You'll have to find the right patent attorney, CAD designer, fabrication shop, plastic injection, the right team in the office and/or the right company for licensing. The prototype stage was a lot of trial and error, as was the development of both tools to fit all major brands and sizes of ladders—aluminum and fiberglass. All of this was definitely a challenge, but I wasn't satisfied until I had the safest tools developed for the consumer.

EGT: Do you have any advice for readers?

LA: Inventing a product is like a roller-coaster ride, and you will also feel like you're stuck in a corkscrew. Your mind-set will have to be a one-way road: straight ahead. Don't let the bumps slow you down. I think specializing or having a background in the field of your invention will help you tremendously. Don't stop studying, and pack your patience. To you and your loved ones: Be safe on those ladders! Good luck!

Details: monkeyrung.com

Edie Tolchin has contributed to Inventors Digest since 2000. She is the author of Secrets of Successful Inventing and owner of EGT Global Trading, which for more than 25 years has helped inventors with product safety issues, sourcing and China manufacturing. Contact Edie at egt@egtglobaltrading.com.

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A Good Trash Talking

SMART DEVICE FOR GARBAGE CANS HELPS IN BUILDING GROCERY LISTS

BY JEREMY LOSAW

Until recently, hearing a voice from a trash can was a serious cause for concern—unless it was Oscar the Grouch on "Sesame Street." Now it's a smarter way to add to your grocery list.

Connecticut inventor Rob Griffin sees the garbage can as a valued part of the home ecosystem that can help families be more efficient. His new product, GeniCan, is a smart device for garbage cans that helps build your weekly grocery list by tracking the products you have used as you dispose of them.

Personal experience showed Rob Griffin the need for GeniCan.

The device mounts to household garbage or recycling bins, and has a bar code reader with wireless connectivity. The user scans the barcode of the item before throwing it out, and GeniCan automatically populates an app-based shopping list.

If an item (like fruit) does not have a barcode, here's where the GeniCan "talks" to you: It asks the user which item it can add to the shopping list. When the user answers, GeniCan uses its voice recognition feature to do just that. The product can be mounted inside of most waste bins, as well as in a neutral area such as the refrigerator or pantry. It retails for $149.

A need is identified

Like so many other inventions, the GeniCan was the result of a need brought on by firsthand experience. Griffin recalls a day when he was having a typical busy parent crisis.

He was on a call with his boss at Microsoft when his wife texted him from the store to send her a picture of the grocery list. She only had a half hour to get what she needed. But Griffin could not break away from the call. After later discussion, he tried to get an app to help solve the problem, but his wife insisted on sticking with pen and paper.

Ultimately, his son was the unlikely source of inspiration—when he threw away a bottle of ketchup.

"It was my 'aha!' moment," Griffin says. "How do I get him to add something to the list? He doesn't have a phone and isn't going to write something down." Griffin immediately started researching to see whether there was anything on the market that would track items as they were thrown away. His search came up empty, and he decided to make the device himself.

Prototyping challenges

The first prototype of the GeniCan was absurd, but it proved the concept. Griffin rigged up a barcode scanner to a full-size PC and stuck it in a garbage can. Then he wondered if it had any broader appeal, so he brought his prototype to a Microsoft hack-a-thon event on the campus where he worked and got a great response.

"I thought it was just my silly problem," Griffin recalls. "Ninety-something percent of people who saw it at the fair said, 'Oh, my God. I wish I had this when my kids were young, but I still need it now because my husband still doesn't add anything to the list.' It was overwhelming that this was a real problem."

Griffin wanted to continue to develop the technology but was in a tricky spot with the intellectual property. The Microsoft hack-a-thon was an internal event and covered by the corporate nondisclosure agreement policy. However, Microsoft held the first right of refusal to develop anything shown. Griffin contacted the intellectual property division; after nine months of negotiations, he was able to get the rights signed back to him. He immediately sought out a patent lawyer and got a provisional patent application on file.

Griffin continued to make advance prototypes. He moved away from the full-size PC and started building the device on the Raspberry Pi development board. He even used the oven in his house to melt plastic for a new electronics housing.

Turning point for funding

His big break came last year, when GeniCan was featured on the TV series "All-American Makers." Griffin and partner David Pestka appeared on The Science Channel show, where the product won investment from venture capitalist Marc Portney. With the boost

PHOTOS COURTESY OF DAVID PESTKA

in funding, Griffin and Pestka were able to hire design firm Evo Design in Watertown, Connecticut, to give the unit an updated look. The team was now ready to make a move to manufacturing.

Griffin is using a mix of domestic and overseas suppliers for production. One of his friends worked at a plastics company that makes office accessories. He took his friend to lunch and got some helpful tips and references for reputable overseas factories.

The group he chose was an original design manufacturer that took the aesthetic design from Evo and finished the design details to make it moldable at a high volume. That solved the issue of the housing, but there was still the matter of the circuit board and electronic components. Evo had some contacts in this space and introduced Griffin to a Connecticut firm that designs and manufactures printed circuit boards. The remaining steps were to manufacture the initial run of circuit boards and do the final assembly and quality control.

CES ramps up exposure

GeniCan made its first big launch at the Consumer Electronics Show in Las Vegas this past January. The team had teased the device at other smaller trade shows but used the power of the biggest electronics show in the United States to get the word out. "The viewership of "All-American Makers" was nothing compared to traction we got at CES," Griffin says.

The first batch of GeniCans is scheduled to ship this spring after last-minute firmware updates and packaging are complete. Griffin expects to have units in large retailers by autumn, well before the holiday boom. Once GeniCan is in stores, Griffin plans some line extensions for his device and wants to develop another smart home device.

Details: GeniCan.com

GeniCan mounts to household garbage or recycling bins, and has a bar code reader with wireless connectivity.

Jeremy Losaw is a freelance writer and engineering manager for Enventys. He was the 1994 Searles Middle School Geography Bee Champion. He blogs at blog.edisonnation.com/category/prototyping/.

Rob Griffin's son was the unlikely inspiration for his invention, simply by throwing away a bottle of ketchup.

Team Is Her Ace in the Hole

GOLFER'S HIGH STANDARDS, EXPERT HELP LEAD TO SUCCESSFUL CART FAN

BY DON DEBELAK

Houston's average winter temperature is in the mid-50s, but this day in 2009 was a warm exception. Area resident Cynthia Wark, an avid golfer, felt the need for a strong fan to keep her cool.

Her search for that product yielded subpar results. "All of the cart fans had to be hard wired in the cart, which didn't help people without a cart, and the battery-powered fans just didn't put out the airflow I thought was needed," she recalls.

Wark has addressed that market need, with some expert help. The inventor of the Personal Golf Fan and the Personal Go Fan has sold more than 4,500 of the fans at a suggested retail price of $149 through her company, Cynwark Corp., since 2014.

The fan has a rechargeable battery and sits in the cup holder of any golf cart. Wark's road to success was fueled by a strong team that could handle many of the technical aspects of the invention and her dedication to providing the customer a top-notch product.

When looking for a suitable golf cart fan, Cynthia Wark was surprised to find they either had to be hard wired in the cart or didn't produce sufficient air flow.

PHOTOS COURTESY OF CYNTHIA WARK

The planning begins

In planning her product, Wark had four design requirements. She wanted to keep the fans at a reasonable weight; create high-velocity airflow; feature an attractive design; and configure the product to fit into a golf cart's cup holder.

She knew she first needed someone to find the right rechargeable batteries and fans to give the product the required airflow. "I had a friend, Mike Payne, who was into radio-controlled planes, big planes that required high-powered propellers to get into the air," she says. "I contracted with Mike to find the right battery and motor to create the airflow we need." Not only did

Payne source the components, he designed little winglets on the fan blades to increase airflow.

For the actual design specifications, Wark chose Justin Bennett, who worked at the same industrial company as her husband, Rick Wark. Bennett, who did product design, graphic design and just about any other artwork at the company, came onboard as a contractor who worked on the project part time. "He is really responsible for the professional look of the product," she says.

Waiting out production

To find a manufacturer for her product, Wark again relied on help from an acquaintance and found Stax Ltd., a Hong Kong sourcing company that specialized in sourcing products with rechargeable batteries. The specialist who worked with Wark's company was Ken Kung.

The first step in the production process was to make an approved prototype on which to base the final design. The manufacturer started with temporary tooling to make rough prototypes to generate feedback, before moving on to what is known in the industry as a "looks like, acts like" prototype.

Not that the process was fast. Wark recalls that "It took about a year, as we had several changes in the product and it took approximately six months to finalize tooling." But by the end of 2013, she was ready and placed her first order for delivery in mid-2014. Her husband helped her through the patent process, which she says took about three years.

Big marketing break

Now it was time to go full swing into marketing. "Once I had my prototype, I applied to be included in the PGA Show Inventor's Showcase. My first big break was to win the show's Pinnacle (first-place) award," which helped generate press coverage from dozens of magazines that drove traffic to her company website.

In fact, Wark originally hired a public-relations team to get the word out to magazines, but the PGA show success that led to the articles—including a key spot in Kiplinger's—helped her decide to drop the firm. The product continues to receive coverage.

Wark has always had a wholesale price that is about 35 percent of her retail price. She hasn't pursued retail shop opportunities, though her product was in the Golfsmith catalog and she has sold her fans to cart companies and some golf courses.

"I just net more money with a direct sale," she explains. "Word-of-mouth advertising has really worked for me, and sales are growing fast enough for me at this time."

Exciting things coming

Wark's first product was the Personal Golf Fan, which has since been replaced by a Personal Go Fan that still sits in a cup holder. The Go Fan also comes with a base so the product can be used in a lot of new applications. She says she started thinking about the new fan when the president of Yamaha told her that he would like a fan for his boat.

Recently, Wark introduced the Personal Golf Tote, originally designed for women, which can fit over the side rail of a golf cart. The product—which retails for $31.99 plus $12 if it comes with custom embroidery—is now starting to sell more units than the fan, thanks largely to promotional orders. She says a golf club in Florida recently ordered 460 units with custom embroidery for an upcoming event. Other upcoming products include the Golf Ball Tee Holder, which holds 12 tees.

Before that warm day in 2009, Wark had never worked on an invention. Her commitment to providing value to the customer drove her attention to detail, ensuring that every prototype and shipment met her standards. Those attributes would not have come into play if she hadn't been willing to team with knowledgeable people at the right time.

Details: pgffan.com

The Personal Go Fan has a rechargeable battery and sits in the cup holder of any golf cart. It also comes with a base so the product can be used in a lot of new applications.

Don Debelak is the founder of One Stop Invention Shop, which offers marketing and patenting assistance to inventors. He is also the author of several marketing books, including Entrepreneur magazine's Bringing Your Product to Market. Debelak can be reached at (612) 414-4118 or dondebelak34@msn.com.

A KEY PROTECTION

Cynthia Wark avoided confusion or complications in her invention process by contracting with many of her helpers, agreeing to compensate them for their work. This is an important step that allows inventors to stay in control of their product and company.

Typically, this is done with an engineering services agreement—which specifies that any intellectual property developed in part by the contractor is assigned to the inventor, or to the inventor's company.

Legally, anyone who has contributed to the conception of an idea should be listed on the patent. But that doesn't mean he or she necessarily owns part of the patent.

A clearly stipulated engineering services agreement can provide important clarity and peace of mind to everyone connected with an invention. You can find samples on the internet by searching "engineering services agreement IP ownership."

ARCHER TAKES AIM

STUDENT'S TEST TO DETECT LYME DISEASE EMBODIES GIRLS SCHOOL'S STEM MISSION FOR YOUNG WOMEN

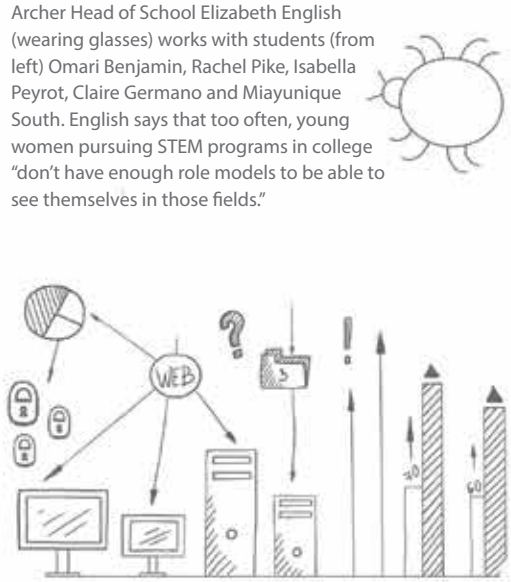
This article was originally published Feb. 10, 2017 in Innovator Insights, *a blog interview series of the IPO Education Foundation. For information, visit www.ipoef.org.*

Despite increasing overall numbers of women enrolling in Science, Technology, Engineering and Mathematics programs at U.S. universities, the rate of STEM degrees awarded to women remains low. Women comprise only 25.8 percent of those in STEM occupations, even with some improvement in the biological and biomedical sciences.

The Archer School for Girls in Brentwood, California, and students such as Marin Yamada are on course to help change those figures. "Archer was founded with the specific mission of empowering young women to ascend to leadership in an environment that is fundamentally innovative, collaborative, and progressive," says Elizabeth English, Head of School at Archer. As part of that, the school encourages "experiential learning," particularly in STEM fields.

A senior at Archer and a student there for seven years, Marin has benefited from this model that includes computer coding as one of four key language requirements, and exposure to basic concepts of engineering, computer science and hands-on research as early as sixth grade.

She was in eighth grade when she began thinking about inventing. By ninth grade, she was taking an environmental science course typically sought out by



PHOTOS BY DANIEL IN

Archer Head of School Elizabeth English (wearing glasses) works with students (from left) Omari Benjamin, Rachel Pike, Isabella Peyrot, Claire Germano and Miayunique South. English says that too often, young women pursuing STEM programs in college "don't have enough role models to be able to see themselves in those fields."

seniors. "It was the first time I realized that, no matter how crazy or weird my ideas are, if I keep trying to make them a reality they eventually can be," she says. "Even if they weren't a complete success, I always learned a lot from the process."

In late 2015, with a proposal due for an honors research class the next day, Marin was inspired by an episode of the TV show "Real Housewives of Beverly Hills" to invent a more efficient way of detecting Lyme disease.

"I don't typically watch that show, but I was feeling particularly stressed and just wanted to float into another world," she says. "It happened to be an episode where one of the main characters was talking about her struggles with Lyme disease and being properly diagnosed. I cried watching it and thought that this was a real problem that I could potentially contribute a solution for."

Armed with the tools and confidence to manifest her idea, Marin spent the next two years developing a lateral flow assay test—the same technology used for a pregnancy test—to detect Lyme disease. She developed a successful prototype and is now working to refine and improve it. Here, she explains more about her invention and her experience with the patent system while English discusses what more can be done to empower girls to excel in STEM fields.

MARIN YAMADA
STUDENT INVENTOR

Innovator Insights: Can you describe your invention and the technology involved?

Marin Yamada: The type of test is called a lateral flow assay. It's a detection format that's used in something like a pregnancy test. I'm revising it, because I'm doing a second year in Honors Research and once you're in the lab, things do change.

I'm experimenting between making it a sandwich lateral flow assay versus a competitive lateral flow assay. It relies on the antibody-antigen interaction and the affinity between them, and then it utilizes nanoparticles. I'm in the process of experimenting with various adjustments to the traditional lateral flow assay to make it suitable for applications where you need to detect proteins in low concentrations. I'm also experimenting with various pre-treatment steps.

With a pregnancy test, for example, the proteins found in the urine of pregnant women come in very large concentrations, whereas in Lyme disease it comes in very sparse concentrations, so I'm going to need to concentrate those proteins so I can detect them. Hopefully, I'll have results in the next few months, which is really exciting.

II: Once you thought of the idea, did you sense how hard it was going to be to actually invent?

MY: I hadn't even heard of Lyme disease before that episode. My initial proposal was completely different than what I wound up working with. Coming up with a procedure and concrete plan was much more difficult than I imagined it would be.

I remember sitting in my room for 12 hours straight, drawing up sketches after reading 200 research articles, and looking at other people's designs and thinking about how I could improve upon them. Eventually, through the process of sketching and then going to the lab and testing it over and over again, one revision finally ended up working. I didn't really ever see an end to it; I thought, "I could be doing this for the next five years, for all I know!" It was a very hard—but empowering—process.

"I think that schools can really educate students on the kind of process that goes into making a product and how the business world operates, but what I think would be most helpful is to have students just go through the process of creating—whether in literature, science, or art." —MARIN YAMADA, STUDENT INVENTOR

II: How did you gain access to all the equipment you needed?

MY: Our high school lab doesn't have fancy equipment like sonicators, but we do have basic lab tools like centrifuges, incubators, refrigerators, freezers and microwaves. The most important tool I have at Archer is teachers who really care about your success and are willing to come up with unique solutions that can help to deal with those problems. I used a UCLA lab once or twice; there was a wonderful man there who was willing to lend me his sonicator, because I really needed that machine. There were other problems I was able to solve at our high school lab, though.

II: Are you in the process of patenting the test?

MY: Following my presentation at the Archer STEM Symposium, I met with lawyers who specialized in patents and IP. We got the ball rolling on the patent process, but then I realized this year that my idea is probably going to change. In the patent world, if you change one thing it becomes a completely different patent, so I thought it would be a better idea to file for a provisional patent in the next few months.

II: Was this your first introduction to patents?

MY: Yes. I didn't really know a lot before. I just knew that big companies usually get patents, and that means you can't make the same thing as them. I think the very first time I heard about patents was while watching an episode of "Shark Tank," and I thought, "That's kind of cool."

II: Now that you know more, why do you think some young people see IP rights as a negative thing sometimes?

MY: I think young people tend to view companies that possess IP rights as people who are greedy and already have a lot of money. That's the logic in a lot of young people's minds. I think what's missing is that you're taking money away from people who have worked so hard to make an album or in the lab to generate a product that can be used by a wide audience. That connection is missing, and I think it does stem from a lack of understanding.

Authors and inventors should be rewarded and credited for their effort and work. It's a privilege for us to even consume these works, so we should definitely be making sure they get the right compensation and reward.

II: How do you think schools and companies can help bridge that gap?

MY: I think that schools can really educate students on the kind of process that goes into making a product and how the business world operates, but what I think would be most helpful is to have students just go through the process of creating—whether in literature, science or art. If the younger generation begins to experience even a little bit of what people in the real world do, we'll be able to bridge that gap and better empathize.

II: What's next for you?

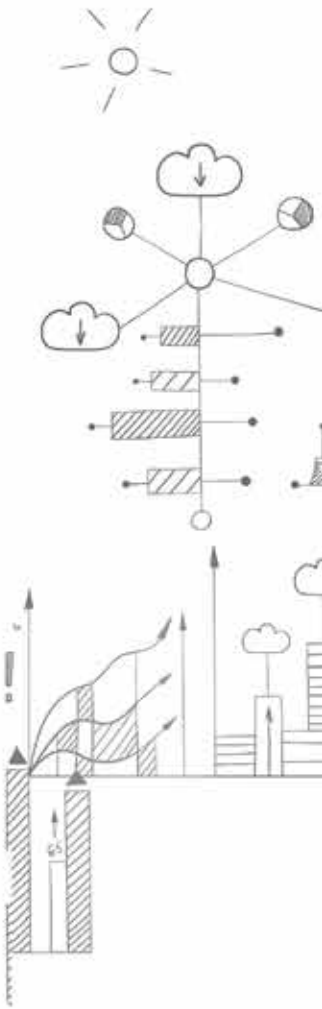
MY: I have a few other ideas for inventions. I'm writing a proposal for a collar for dogs and cats and an app to de-escalate the problem of missing pets. And I will be attending college and continuing invention and science.

I want to be immersed in an environment where I can think creatively and work on my Lyme disease test, but I really want to branch out into other areas as well. I studied coding last summer and want to branch out into computer science, because I think that's where a lot of our future is and it's just fascinating. Our lives revolve around technology, and I think it can be really beneficial to humankind.

II: What advice do you have for other kids who want to invent?

MY: I think my main advice would be just go for it. I know it can be intimidating, but focus on the scientific process itself and less on making something that's going to change the world or be the best. That mentality can be really damaging to the process, because science—the ability to experiment and discover something new—is really beautiful. I went through hundreds of minor or major changes, but every change really does benefit your experiment and project.

Also, we should be thankful that, as young people, we even have the power to make a difference in a lab. That's a really special thing that not many high school kids could have done 40 or 50 years ago. It's a privilege we've been given, and we should embrace it.



ELIZABETH ENGLISH
THE ARCHER SCHOOL FOR GIRLS

II: What drew you to working in girls' schools?

EE: I saw a real dearth of women at the highest levels of educational leadership. If you look at the data, it's clear that while roughly 75 percent of the people who work in schools are women, they account for less than 25 percent of the heads and principals. The higher up you go, the worse the statistics get. That's ultimately what motivated me to become an educational leader. I also believe in fundamentally innovative education, but what really drove me to girls' schools was their mission to explicitly promote female leadership.

II: How do girls' schools do that better?

EE: At Archer, about 29 percent of our students go into STEM fields, compared to 2 percent of girls who attend co-ed schools nationally. A lot of that simply has to do with the confidence gap. When you're in an environment for 12 years where the only person called on is a girl and the only leaders in student government are girls, it has an incredibly powerful impact on confidence. There's never a question about whether a girl can be a coder or a leader or an engineer; that's all they see.

We also know from the research that because of gender bias, whether we're men or women, we call on boys more; we give them more praise; we interrupt them less. Over a lifetime of schooling, this has a cumulative impact on a girl's confidence. So when you remove that variable of gender bias, it's incredibly empowering for a young woman.

The first three female Secretaries of State were all girls' school or women's college graduates. Worldwide, over 70 percent of the female heads of state are either girls' school or women's college graduates. They get out there and they never question themselves, and they're also conscious of gender bias, so when it happens they don't internalize it.

II: How does Archer use this model to promote STEM specifically?

EE: At Archer, we think that particularly in the STEM fields, one of the biggest barriers to pursuing those programs in college is that girls don't have enough role models to be able to see themselves in those fields. It's really important to us that girls have ample opportunity to do engineering and science research so that the younger students in the school see the older girls engaged in these pursuits.

We have an inquiry-based approach to learning. There's obviously content coverage, and we believe that's important, but we also believe the human mind has a basic need to inquire and discover. This is particularly powerful in children. You really have to set up your curriculum and school day in a way that allows time for inquiry and guided discovery.

All of our sixth-graders have a world language rotation. They take a quarter each of Spanish, French, Chinese and coding. We believe coding is a universal language and that all students should be proficient in a variety of coding languages by the time they graduate.

Science is research, not memorizing a textbook. We don't reserve research learning for upper-school students. We have the "Little SIS Symposium" for

Elizabeth English, shown with students Anaya Nwachuku Thompson (left) and Ariana Golpa, says that about 29 percent of Archer students go into STEM fields---compared to 2 percent of girls who attend co-ed schools nationally. She attributes the "confidence gap" to Archer's all-female environment.

middle-school students, in which the middle school conducts inquiry-based science research on a smaller scale than the older girls. They get exposure to concepts of engineering, computer science and research right off the bat. In terms of engineering, we have all types of courses and units that teach girls right away that they can be designers and engineers, including courses on game design and app creation.

II: Most girls don't have the benefit of an environment like Archer's, though. What more do you think can be done to encourage women in STEM overall?

EE: What's really discouraging to me is what's happening in higher education. We see more women majoring in STEM fields, but they continue to drop out at a very high rate. A lot of these colleges and universities will brag that 40 percent of their freshman class in the school of engineering are women, but ask them what percentage graduate. It's heartbreaking.

I think what's happening is that colleges and universities, first of all, have very few female professors. Women walk into classrooms that are predominantly male, and then the professor is also a man. That can be very intimidating and discouraging. But we also don't teach engineering in an inquiry-based way in college. We deliberately teach courses that are designed to "weed people out," and girls are much harder on themselves than boys. I think we're teaching it backwards.

II: Marin mentioned in her interview that it would be helpful for students to have more exposure to IP in order to better understand the need for IP protection. Have you considered incorporating courses on IP?

EE: This is the new frontier for us. Just last year, we started to realize that we had kids who were inventing things that needed to be patented. I think there was a lag in our understanding of how critical it was, and how we could best help students and protect both them and Archer when there is IP at stake.

Dr. Gary Michelson (IPOEF board member) forwarded the work IPO did with 20 Million Minds, and we're definitely going to be working with that curriculum now. (The 20 Million Minds Foundation supports the development of innovative digital publishing, assessment, social, and educational instructional tools.) We've been talking to our attorneys, because it's not simple in a school setting. Most secondary schools haven't even begun to think about these things. There are a lot of concepts like IP and business ethics that we're playing catch-up with, but we are getting on top of it now.

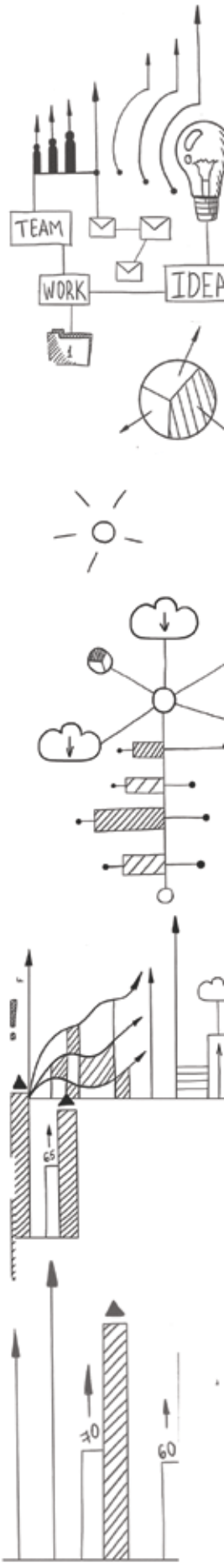
II: What do you say about Marin's invention?

EE: I think it is a shining example for schools and educators everywhere. Young people are wired for invention and discovery, and schools need to be places where we support and foster that and not frustrate it.

The thing I love about Marin is, it never occurred to her that she couldn't do this. She has incredible perseverance and optimism. We talk a lot at Archer about the "centrality of grit" for highly successful people. That's a term used by Angela Duckworth, a professor of psychology at the University of Pennsylvania, for people who have that zest, optimism and resilience. All of those qualities are so obviously part of who Marin is.

I'm proud of Archer for creating the environment, teaching and learning structures that enabled her to pursue something like this, and giving her the time and resources to do it, but I think at the end of the day Marin just has all the right qualities of an inventor.

Innovator Insights is IPOEF's forum for inventors and other IP stakeholders to discuss their work and the role IP plays for them, and to help educate the public on the link between strong IP protection and robust innovation. Read more at www.ipoef.org.

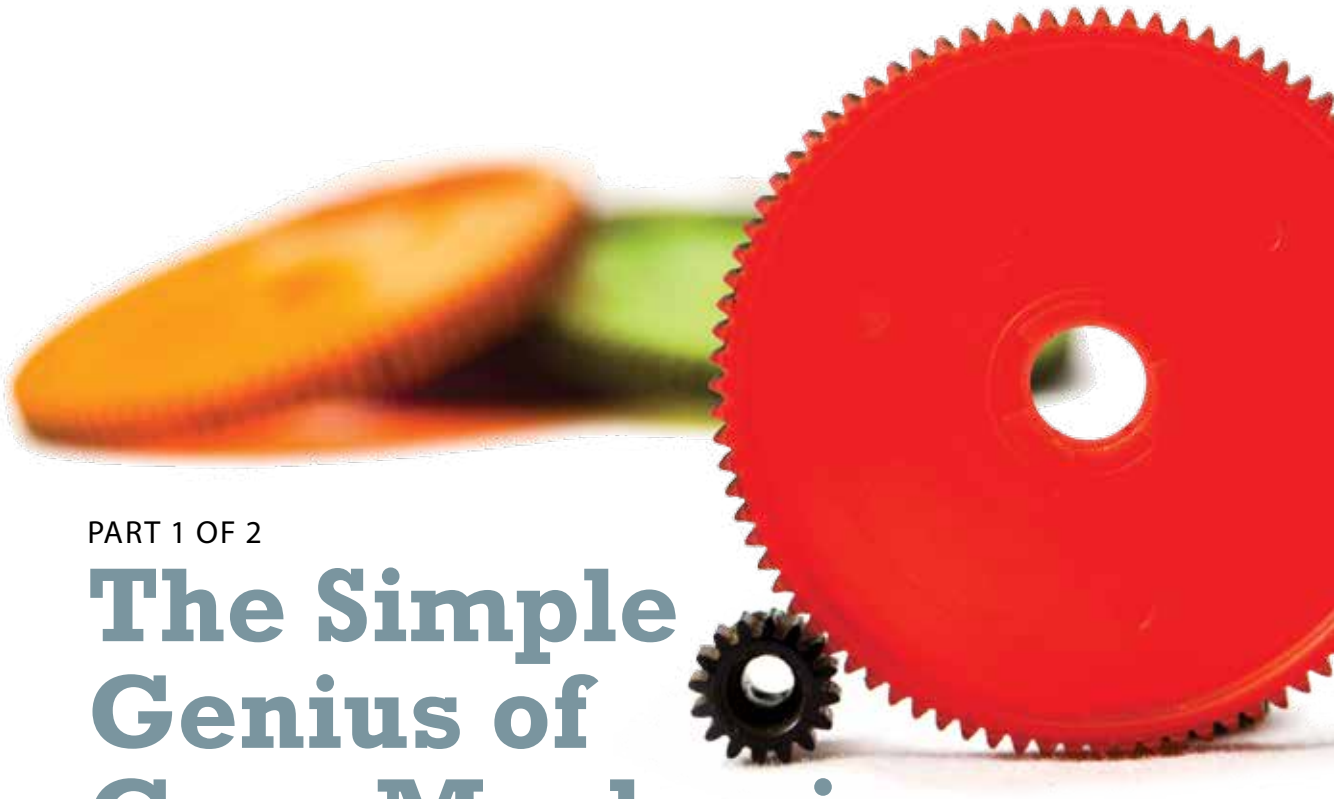


About IPO Education Foundation

Intellectual Property Owners Education Foundation is a non-profit organization devoted to educational and charitable activities designed to improve intellectual property rights. The Foundation conducts programs to:

- Broaden public understanding of systems for protecting intellectual property,
- Sponsor awards for the purpose of recognizing outstanding achievement in the fields of invention, creativity and IP rights, and
- Publish reports dealing with legal, economic and other aspects of intellectual property.

IPO Education Foundation is tax exempt under tax code 501(c)(3). Donations to the foundation by individuals are tax deductible to the extent allowed by law. IPO Education Foundation was established by Intellectual Property Owners Association (IPO), a trade association with members who own or are interested in intellectual property rights. To find out more about IPO Education Foundation programs or how to make a donation, call (202) 507-4500 or visit the website at www.ipoef.org.



PART 1 OF 2

The Simple Genius of Gear Mechanics

PROCESS DRIVES COUNTLESS INVENTIONS FOR CONSUMERS

BY JEREMY LOSAW

The word "gear" is embedded into the lexicon of our culture in many ways, often with metaphors related to its purpose as a mechanical element. When a football team has a miserable game, its coach may say the players never got out of first gear. When people change direction with their lives, they talk about switching gears.

In an episode of "Family Guy," main character Peter Griffin says that life's frustrations are "grinding his gears." And then there's this quote from Shakespeare's "The Merchant of Venice": "Well, if Fortune be a woman, she's a good wench for this gear." (Modern translation: If luck is a lady, she's good at this business.)

A compound gear train inside a servo is a good example of massive torque in a small footprint.

The translation that links "gear" and "business" fits well today. Gears are found in a number of consumer products—from printers to paper towel dispensers—and are a useful mechanical element that can help us magnify the torque or speed of innovations. This Part 1 of a two-part series on gears will explain what they are, when to use them, and some basic calculations. Part 2 will discuss alternative types of gears and how to use gears in prototypes.

A gear is a mechanical element with teeth that interlocks with the teeth of another gear. The most common type is the spur gear, which is circular and has triangular teeth. Rack gears use the same shape of gear tooth, but the teeth are arranged in a straight line. When multiple gears are meshed together, it is called a gear train.

When do you need gears?

Anyone who has ridden a multi-speed bike knows the value of gears. When riding up a hill, it gets harder to pedal, so you shift down. It is easier to pedal, but you have to pedal more revolutions to get up the hill. On the way down the hill it is easier to pedal, so you shift up. This makes it harder to pedal, but you can get a much higher top speed.

The usual reason a product needs a gear or set of gears is when it needs more torque or rotational force. For example, a toy car may have a very small motor that can spin very fast, but the wheels may be too heavy

PHOTOS BY JEREMY LOSAW

for the motor to move it. In this case, adding a gear train multiplies the torque the motor can put out so that it can drive the wheels.

In some instances, gears can increase rotational speed. For example, hand-cranked battery chargers require the motor inside to turn very fast, to generate electricity and charge the battery. The hand crank is connected to a gear train run in reverse, which multiplies the cranking speed from the hand to the motor and generates more current from the motor.

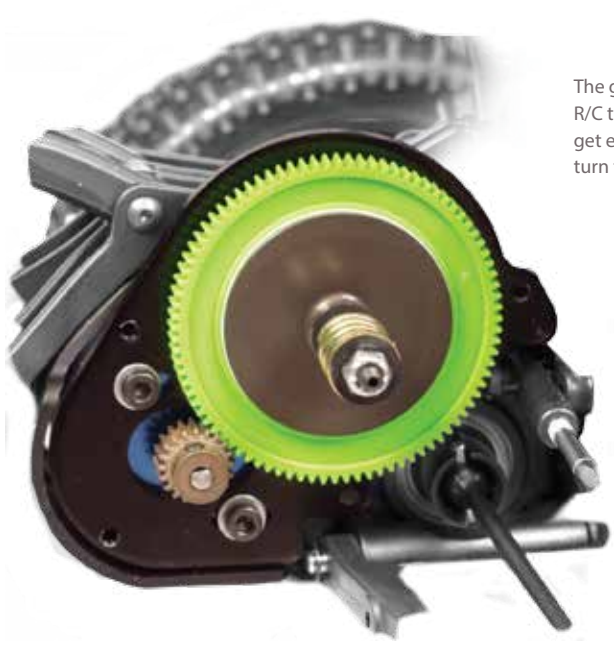
Another reason to use gears is to multiply the number of rotational outputs. In a four-wheel-drive car, pistons fire to rotate a single crankshaft. Through a series of gears and axles, this single output can be expanded to rotate all four tires at once.

Gear basics

The easiest way to understand the effect a gear train can have is to start with the spur gear, which is characterized by its number of teeth and pitch. The pitch is the size of a gear's teeth, specifically the distance from a point on one tooth to the corresponding point on the next tooth. The higher the pitch, the smaller the gear teeth, and the smaller the diameter of the gear. For example, a 46-tooth gear that is 48 pitch (48 teeth per inch) is 1 inch in diameter, but a 46-tooth 64 pitch gear is 3/4 inches in diameter. Gears that are meshed together must have the same pitch in order to mesh and move properly.

The fundamental characteristic of a gear train is the gear ratio. The gear ratio is the force multiplier that the gear train adds to a motor. For example, a 2:1 (said 2 to 1) gear ratio multiplies the torque of the motor by 2 while dividing the speed by 2.

The gear ratio is easy to calculate in a two-gear system. It is simply the number of teeth on the output gear divided by the number of teeth on the motor gear. Any number of gears can be put in between the motor and the output gear; as long as they are on different axles, they will not change the gear ratio of the system. These are called idler gears, and they do not contribute to the gear ratio.



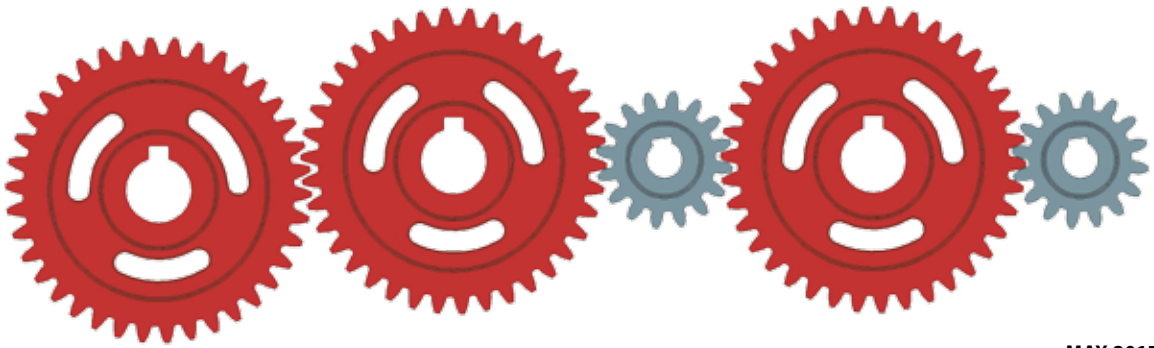
The gear train on an R/C truck enables it to get enough torque to turn the wheels.

The usual reason a product needs a gear or set of gears is when it needs more torque or rotational force.

Compound gears

When two or more gears are fixed onto a common axle, it is called compound gear. When compound gears are assembled together into a gear train, they can create more torque in a much smaller package than a two-gear train. Servos are a great example of the use of a compound gear train. They use a very small motor that can spin very fast and drives a compound gear train to create massive torque in a small footprint.

In a compound gear train, gear ratios between every step are multiplied together to get the final gear ratio. It is not uncommon to see compound gear trains that have ratios in the hundreds that utilize the same space of a simple gear train that has a ratio of 5 or 6 to 1.



This gear train has five gears, but the three in the center do not contribute to the overall reduction. These are called idlers. The ratio of this gear train is 2:1.

6 Steps to Catch an Inside Contact

MAKING THAT KEY COMPANY CONNECTION BOOSTS YOUR INVENTION'S CHANCE OF SUCCESS

BY DON DEBELAK

Inventors have a much better chance of launching their product with a larger company if they can find an inside contact to give them advice and help make connections.

You don't need to go hat in hand when working on an inside contact. These connections gain as much as you do when they present the project. In fact, it is a win-win situation for them.

An insider who brings the project to the company for a licensing, marketing or private label deal looks like a go-getter who is helping to make deals whether the project goes to completion or not.

These steps can get you an inside contact with a potential partner company:

1 Go in armed with data

You won't strike your best deal by just showing your invention. You'll need to show positive first market research and initial sales success with intriguing possibilities, then tell the insider that your concept seems so strong you feel it will do best if you partner with a marketer immediately.

This approach allows you to enlist partners in the beginning phases of an exciting opportunity, rather than risk the insider's perception that you're looking to team up after failing to successfully market your product on your own.

2 Start with a salesperson

You can meet salespeople by requesting literature from trade magazines. Ads and product announcements in trade magazines typically give a contact email where people can request literature. You can find trade magazines by listing the industry and the words "trade magazine" in an internet search.

You can also attend trade shows (listings of trade shows are online and in industry magazines) and meet salespeople by talking to them at their booth. Try to walk the shows early in the morning or late in the afternoon when the number of real customers is low. Once you meet salespeople, ask to take them to lunch because you need some input from them on a concept you think might do well in the market.

3 Develop a presentation

Use a product presentation to explain your product, with the initial sales success you have had and some research you've done on the larger market. Don't try to sell the salesperson; just show him or her the presentation with the observation that you're trying to decide what would be a good next step to expand sales.

4 Ask for input on your idea

Be receptive to what the salesperson has to say, then ask whether this is a product that might be of interest to his or her company. More than likely the person will have a few comments on how it could be done with his or her company, with suggestions on making the concept "just right" for the target company.

5 Seek out the marketing manager

If the salesperson is on board, make at least some of the changes he or she suggested and ask for a meeting with the regional manager or marketing manager. Usually, that person can meet with you when the manager comes to town, at a trade show, or you might be able to visit the company's location.

6 Go for the 'big meeting'

Once you present your product to the regional or marketing manager, he or she can set up a key meeting with the right people at the company. The marketing manager may give a sales pitch about how your product could have a significant impact on the company before you even get started.

CROSS-COUNTRY STUNNERS

INTELLECTUAL VENTURES TO BRING LAB INVENTIONS TO D.C. FOR TECH EXPO

At this year's Intellectual Ventures technology expo on Capitol Hill, visitors can see a scale model of a traveling wave nuclear reactor; a photonic fence (a virtual fence that detects and destroys insects with a laser by zapping them as they cross its plane), and a vaccine storage system that allows remote clinics to store life-saving vaccines for up to a month without electricity.

That's just for starters. Displays at the June 29 event will give guests a little taste of the endless innovation smorgasbord available to guests at IV's nearly 90,000-square-foot laboratory across the country in Bellevue, Washington. The lab works with 11 of the United States' top 50 inventors that include the two most prolific American inventors ever, Dr. Lowell Wood and Dr. Rod Hyde.

As visually impressive as these technologies are, the how is a big part of the wow. For example, the prototype for the photonic fence is now in its third generation. Technical project lead Arty Makagon recently told the IV blog, "We have videos of earlier tests where you can see via high-speed camera that we burned the wings off mosquitos. That's neat to watch, but it turns out that it's gratuitous overkill—and so that isn't how the machine works now. After we shoot a bug, when we look at it under a microscope, we can't tell where it was shot. There are no singe marks and no gaping wounds.

"So how did the bug die? We sent samples to the University of Washington histology lab and found out that essentially we end up cooking the bug. Our laser acts like a very precise, 'short-wavelength microwave oven.' When you look at a cross-section of a chicken breast cooked in a microwave and a cross-section of a bug dosed with a laser, they essentially look the same."

The fence was invented as a pesticide-free defense against the spread of malaria, which kills more than 600,000 people a year. The device is also being considered as a means for combating agricultural pests.

That killing machine is in stark contrast to the Arktek vaccine storage system and its unique potential to save lives. Arktek uses super insulation techniques similar to those for storing cryogenic fluids and protecting spacecraft from extreme temperatures. Once stocked with ice, the system can keep vaccines at the correct temperature for a month or more.

The sensitive nature of vaccines is dramatically illustrated by the fact that about 1.5 million children die each year from vaccine-preventable diseases. Vaccines can spoil if they're not kept at precise temperatures, from manufacture to use.

The expo, open to the public, will be from noon to 5 p.m. at the Rayburn House Office Building Foyer, across from the U.S. Capitol in Washington, D.C.

Using equipment that studies photonics, nanotechnology, chemistry, biology and other disciplines, Intellectual Ventures researchers are granted hundreds of patents each year. Lab-invented technologies have been used as the foundation for five new venture-backed start-up companies. IV has infused more than $2.3 billion into the economy since 2000; more than half of that has been paid to independent inventors, start-ups and subject matter experts, and to universities and governments. ◆ *—Reid Creager*

IV Tech Expo, June 29

Open to the public
Noon to 5 p.m.
Rayburn House Office Building Foyer
Washington, D.C.
(across from the U.S. Capitol)

INTELLECTUAL VENTURES®

U.S. Falls from 1st to 10th in Patent System Strength

AMERICA STILL NO. 1 IN IP PROTECTION, CHAMBER INDEX SAYS

BY GENE QUINN

The United States was again the top-ranked country for intellectual property protection in the recently released U.S. Chamber of Commerce's Global IP Index for 2017, but the rankings for the economies of America, the U.K., Japan and the European Union ranked more closely together than ever. No doubt this was significantly due to the United States tumbling to 10th from first on patent system strength.

The United States continues to take steps backward due to a variety of self- inflicted wounds. Among them: the omnipresent threats of more patent reform, a Supreme Court that has created unprecedented uncertainty surrounding what is patent eligible, and a Patent Trial and Appeal Board that has been openly hostile to property owners, allowing harassment of certain patent owners repeatedly while failing in its mission to provide relief from patent trolls.

The 2017 Chamber index marks the first time that the United States has not ranked No. 1. The United Kingdom ranks first, followed by Switzerland; Sweden; Germany; France; Japan; Spain; Singapore; Italy, and the United States.

Other countries making gains

Meanwhile, a number of countries around the world have taken positive steps forward on the patent front, including countries that might not ordinarily be considered patent-friendly jurisdictions.

For example, much has recently been made of the fact that China is aggressively pursuing pro-patent policies and becoming inviting to both patent applicants and as a forum for dispute resolution through litigation in Chinese courts. China has introduced new enforcement mechanisms and specialized IP courts to better combat counterfeiting and piracy; joining it in these efforts were Pakistan, the United Arab Emirates and Sweden. And while not reflective in the 2017 rankings, China's recent patent law changes making software and business method patent eligible should result in a significant improvement in the patent landscape moving forward.

Last year also saw multiple governments undertake a review of their IP laws, recognizing that such laws must keep pace with the emerging challenges IP owners face. In South Korea, amendments to its patent act helped streamline and expedite the patent examination process. Likewise, the government of Taiwan began a review of its IP laws in an effort to better comply with standards included in the Trans-Pacific Partnership. Furthermore, many economies recognized the value of leveraging international partnerships through Patent Prosecution Highways. Countries that signed PPH agreements in 2016 included Argentina, Chile, Colombia, Mexico, Peru, the Philippines and Vietnam.

Despite these positive developments, some other countries took unfortunate steps to restrict IP rights in 2016. Ecuador, Russia and South Africa all introduced new requirements for local production, procurement and manufacturing. The high-tech sector also continued to face stiff head winds in the Indian market with regard to the scope of software. The Canadian government also continued to apply heightened patent utility standards, and Indonesia introduced a heightened efficacy requirement for patentability and outlawed second-use claims.

At this moment in history, almost everything we thought we knew about the global patent landscape and patent protection in general is being challenged. The United States' falling from the most patent friendly jurisdiction in the world to being tied for 10th with Hungary really puts into perspective the fall from grace that patent rights are experiencing in America.

Gene Quinn is a patent attorney, founder of IPWatchdog.com and a principal lecturer in the top patent bar review course in the nation. Strategic patent consulting, patent application drafting and patent prosecution are his specialties. Quinn also works with independent inventors and start-up businesses in the technology field.

‘We Are Facing a Crisis’

CHIEF JUDGE: RECENT CHANGES TO U.S. PATENT SYSTEM STYMIE MOTIVATION, BUT THERE IS HOPE

BY GENE QUINN

Is the United States reducing the possibility of future innovations by weakening patent rights for short-term gains? That was the question presented during the opening video at LeadershIP 2017, a patent and antitrust policy conference held at the Newseum in Washington, D.C., at the end of March.

The event opened with a keynote address from Judge Paul Michel, retired chief judge of the United States Court of Appeals for the Federal Circuit.

“In our time together today, we are going to try and take stock of the health of the American patent system,” Michel began. “It is important to remember that the patent system was founded in the Constitution… and although the world ‘right’ appears many times in the Bill of Rights, in the original Constitution the only ‘right’ mentioned is the patent right.”

Michel identified three separate waves of change that have rocked the patent system over the past several years. First is the creation of post-issuance review of patents, ushered in by the America Invents Act that was signed into law in 2011. The second is the quartet of patent eligibility decisions from the United States Supreme Court (i.e., *Bilski, Mayo, Myriad* and *Alice*). The third wave of change relates to actions being taken by regulatory and competition authorities around the world and in the United States.

“Several years ago, it would have been little exaggeration to say that we are facing a challenge,” Michel explained. “Today, we are facing a crisis.”

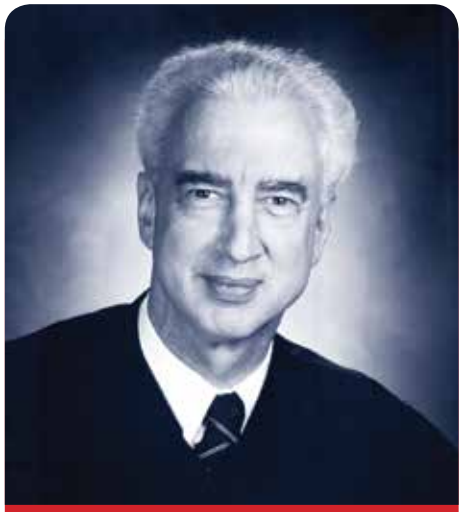
Uncertainty is king

Judge Michel explained that the primary purpose of the American patent system is to increase innovation through incentivizing investment. Investors are concerned with three things, he said: “What are the odds of any return of investment, what is the scale of return, what is the time to money.”

Investment is being disincentivized by uncertainty created by the aforementioned waves of changes to the system. We should be looking at the impact on the flow of money, he explained.

But because of these waves of changes, which have been manifestly real and caused tremendous harm to patent rights holders, uncertainty has worsened. "Before the AIA, patent litigation uncertainty was high," Michel said—and since the AIA, patent litigation remains even slower, more expensive, more risky and more uncertain than ever. "Then came *Bilski* and *Alice*, and patent litigation became even more risky and more uncertain," he explained.

These changes have done nothing other than create significant disincentive to investors who provide capital, the very lifeblood of innovation. Uncertainty is driving down funding sources, with biotechnology firms particularly hard hit, Michel explained. Furthermore, based on publicly available sources of information, economists estimate that "patent values have dropped by as much as 60 percent in the last five years," he said.



"Patent values have dropped by as much as 60 percent in the last five years."

— PAUL MICHEL, RETIRED CHIEF JUDGE OF THE UNITED STATES COURT OF APPEALS FOR THE FEDERAL CIRCUIT, CITING ECONOMISTS' ESTIMATES

Politicians starting to get it?

Judge Michel did not limit his criticism of changes in the law to changes occurring in the past several years. Pointing to the fact that patent infringement trials are faster, cheaper and surer overseas, he explained that in some countries injunctions are routinely granted. For example, in Germany, injunctions are virtually certain, "which causes settlements after a trial," Michel explained.

In the United States, the Patent Trial and Appeal Board—created by the AIA—was supposed to lead to faster, cheaper and more efficient administration of validity disputes. Instead, the PTAB has become almost omnipotent, with the federal circuit routinely deferring to the agency tribunal. This has become a precursor to patent litigation, thereby extending rather than shortening the timeline of disputes.

"The Patent Trial and Appeal Board has become even more important than the district courts because it has become a weigh station," Michel explained. "It has become a prelude to district court litigation."

Judge Michel also took aim at the dual standard for interpreting claims used by the United States Patent and Trademark Office. According to Michel, patent claims have but one meaning—the *Philips* meaning. (The Philips standard says that the words of a claim are generally given their ordinary and customary meaning, i.e., the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention.) He said he doesn't understand how a claim can be invalidated under any other standard.

I agree. Not using the *Philips* standard simply means the patent office refuses to provide a presumption of validity and is again looking at the claims as if they are doing so in the first instance where the claims are not entitled to any statutory presumption. The problem, of course, is the patents have been issued; U.S. code requires a presumption of validity for issued patents; the administrative trial process is not an examination; there is no right to amend claims at the PTAB; and patent owners are not entitled to few procedural rights that would even remotely approximate adequate due process. So, patent owners must spend many tens of thousands of dollars (if not more) and spend up to a decade (if not longer) to obtain patents that then are afforded no statutory presumption of validity. How this can make sense to anyone is beyond me.

Judge Michel wrapped up by saying: "In our society, things have to get pretty bad before they get better, because politicians lag… But I think they are beginning to catch on." He said that industry involvement and engagement will be required in order to see positive pro-patent reforms become a reality.

Now is not the time to give up hope, although for a variety of reasons it would be easy to do just that. I also believe he is correct when he says that our political leaders, or at least some, are starting to catch on to the damage that has been done in recent years to the U.S. patent system. There are national security issues, significant economic issues and the future of innovation dominance. These issues in the late 1970s and 1980s led to political forces swinging in a pro-patent direction. Perhaps the same will happen at this moment in history.

PHOTO COURTESY OF AIPPI.ORG

How to Re-Stoke Our Creative Fire?

D.C. PANEL DISCUSSES IP ISSUES, FUTURE UNDER TRUMP

BY GENE QUINN

The first panel at the recent LeadershIP conference in Washington, D.C., addressed IP policy in the Trump Administration. At times, the diverse voices and viewpoints were as controversial as the president himself.

Panelists were F. Scott Kieff, commissioner on the International Trade Commission; Professor Mark Lemley of Stanford Law School; Dan Schneider, the executive director of the American Conservative Union; and Deanna Tanner Okun, partner at Adduci, Mastriani & Schaumberg, and former chair of the U.S. International Trade Commission.

Kieff explained that if we shift our frame of mind as it relates to intellectual property, we can have a large benefit for a very low cost. That said, "If we try very hard to provide direct incentives to inventors to invent or investors to invest… we are going to have to have an immense amount of information." Conversely, if government were to get involved only to the extent of settling the law and allowing private parties the certainty to contract, little or no information is necessary about the motivations of the parties because everyone will be free to act according to their own preferences.

Kieff likened patent rights to a flashlight held in a dark room. He explained that if a property right such as a patent can be like a beacon in the dark—which can be found by those who are similarly interested in that asset—the government does not require massive amounts of data, or to know what is motivating each person. When the benefit is indirect and left to the parties to figure out, the government need only set rules so that those interested in the asset can contract accordingly in an environment of certainty and stability.

Unfortunately, the law as it relates to patents is anything but stable or certain, and the Judicial, Executive and Legislative branches of government have gotten in the way of the private sector achieving private negotiated administration of property rights.

A patent is a property right

Schneider began his remarks by quoting from the Declaration of Independence: "'We hold these truths to be self-evident'—these are powerful, poetic words. Some of my Libertarian friends forget that the government was created to protect our inalienable rights."

He said he began with the Declaration of Independence to drive home the point that these questions are political in nature. "We've polled our CPAC (Conservative Political Action Conference) attendees on intellectual property. Thirteen percent of attendees did not have an opinion," Schneider explained. "Of those who did respond, almost 95 percent of conservatives believe intellectual property rights should be strengthened. Only 5 percent thought they were too strong and should be weakened."

He added that there is a deeply held belief among conservatives that property simply should not be taken away by the government without proper recourse. "The thing that most grassroots conservatives care about is that people don't trespass on their property," Schneider explained. "There is this visceral reaction to people taking their stuff without recourse."

We can argue, perhaps, whether patents are being taken away without proper recourse, but when so few procedural rights are afforded to patent owners at the Patent Trial and Appeal Board, and speed is exalted above all else—including fairness—real

questions are legitimately raised about whether due process of any significant kind is afforded to patent owners in PTAB proceedings.

What cannot be debated with any sincerity, however, is whether a patent is a property right (that is stipulated in U.S. code), although some still do. A long line of Supreme Court cases equate patents to property rights.

Moving along just fine?

The first controversial statement from the panel came from Lemley. He said that if you look at decades of data, the fundamentals of the patent system have been moving along status quo regardless of changes to patent law. Lemley's point was that patents continue to be applied for and continue to issue in record numbers.

"There is a presumption somehow that patents are not good—that strong, enforceable patents are really just monopolies. If government officials believed patents are good, you'd see a different outcome."

—DAN SCHNEIDER, EXECUTIVE DIRECTOR OF THE AMERICAN CONSERVATIVE UNION

Although this is true, in some segments it is practically impossible to obtain patent protection in the United States. Those segments are areas where our country has historically had a significant technological advantage—namely, in software and biotechnology. Also, a U.S. Chamber of Commerce report issued this year said that America has fallen from the top jurisdiction in the world in terms of patent protection to 10th *(see related story)*.

This doesn't sound particularly like the fundamentals of the patent system are strong, or moving along just fine. The reality is that the American patent system is in crisis, as affirmed by Judge Paul Michel, retired chief judge of the United States Court of Appeals for the Federal Circuit, in his opening keynote address.

Lemley also took issue with patents being described as a property right, saying that discussing intellectual property (i.e., patents), as a property right is a complicated matter because some aspects of the right fit some parts of a property rights regime. Although he didn't say it, the necessary implication is that there are some aspects (left unidentified) that do not fit with a property rights regime.

The problem with patent law, according to Lemley, is that there is no independent invention defense. And he said that the problem with not having an independent invention defense is, people who invent themselves couldn't possibly find out about what others have invented because these inventions reside in unpublished patent applications at the patent office. "You have people who genuinely tried not to infringe," Lemley said.

If you believe those who infringe genuinely are trying not to infringe you might be tempted to believe Lemley. But when you build an argument on something that is provably false, the entire argument tumbles like a house of cards.

In fact, those who infringe do nothing of the sort. In many major corporations, patent searches are simply not done, and in fact reading the patents or patent applications of competitors is strictly forbidden. Furthermore, when these infringer companies are notified that they are engaging in activities that infringe the rights of patent owners, they generally do not attempt to engage in licensing talks or any kind of due diligence, which you would expect from those who are genuinely trying not to infringe, as Lemley suggests. Instead, the infringer companies simply throw away the letters they receive. In-house corporate attorneys speaking at industry events are practically giddy as they explain that they simply "circular-file" letters they receive from patent owners, or laugh when they say that they don't infringe valid patents.

Although Professor Lemley is entitled to his opinion, and he is an excellent and formidable attorney, he is not entitled to his own facts. Deliberate disdain for patent property is a purposeful business model driving mega-tech IT incumbents. This business model is called "efficient infringement." Efficient infringement is a cold-hearted business calculation whereby businesses decide it will be cheaper to steal patented technology than to license it and pay a fair royalty to the innovator, which they would do if they were genuinely trying not to infringe.

Large entities realize there are a certain number of patent owners who are simply not going to assert their patents for one reason or another—frequently because they don't have the money to do so. Then there is another group of those that will assert their patents but will not win. The efficient infringement calculation progresses to realize that there is only a small group of those who are likely to assert patents and prevail, thanks to all of the hurdles put in place (i.e., patent eligibility challenges, the Patent Trial and Appeal Board, etc.). The calculation further recognizes that even if a patent owner prevails, a permanent injunction is virtually impossible to obtain as the result of the Supreme Court's decision in *eBay v. MerchExchange*, and damages are likely to be minimal thanks to a continual judicial erosion in

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damages available to vindicate valid patent rights that have been adjudicated to be infringed.

Missing the larger point

Lemley also disagreed with Judge Michel that the patent system is in crisis, noting that the uncertainty to the extent it exists is a patent litigation matter, and patent litigation is a very small part of the overall system. This allows him to come to the conclusion that changes to the law do not greatly impact the system.

According to Lemley, so much of why people get patents relates to considerations other than litigation. Lemley is correct but misses the critical point, which is that the value of a patent is tied directly to the likelihood that it could be enforced in litigation. An exclusive right without the ability to be enforced isn't much of a right, and is worth very little. So as patents have become less likely to be patent eligible, and as patents have become so much easier to challenge and therefore much more vulnerable, the entire corpus of issued patents have been dramatically affected by a series of self-inflicted wounds that have rather stupidly forfeited the American advantage.

The inconvenient truth is, America no longer fuels the fire of creative genius with the patent system. Meanwhile, China is open for business; effective April 1, both software and business methods were to be patent eligible in China. Germany is also open for business. There, an injunction is routinely given to victorious patent owners—which, as Judge Michel explains, frequently leads to settlements after a verdict. The United Kingdom is also open for business and is the top jurisdiction in the world for patent protection, according to the U.S. Chamber of Commerce. The U.K. is tied for first with Switzerland, Sweden, Germany and France. The United States is tied for 10th, with Hungary.

"There is a presumption somehow that patents are not good—that strong, enforceable patents are really just monopolies," Schneider explained. "If government officials believed patents are good, you'd see a different outcome."

A voice of hope

Perhaps there is some reason for hope. According to Deanna Tanner Okun, there is reason to believe that the Trump Administration will be pro-enforcement, which would be good for patent owners.

"Here is someone who believes in enforcement and believes in protecting U.S. rights," said Tanner Okun, speaking of U.S. Trade Representative nominee Robert Lighthizer. "I look at this, and I see opportunity…there is a lot of room for positive things to happen."

She wrapped up the panel by asking about the message America is sending overseas with our actions at home. She lamented the fact that we are losing sight that the reason we have capital come into the United States is because we have strong intellectual property rights. "What message does it send to economies abroad," said Tanner Okun, "if signals coming out of the U.S. are going the wrong way that send the wrong message?"

End Regulations That Inhibit Patents

TRUMP'S ORDER IS A START; NOW HE MUST MAKE USPTO MORE PATENT FRIENDLY

BY GENE QUINN

On February 24, President Donald Trump issued an executive order that directed agencies to review all regulations in a search for those that are outdated, unnecessary or ineffective. The goal is to streamline regulations by eliminating those that inhibit job creation, eliminate jobs, or are inconsistent with government initiatives and policies.

Michelle Lee—finally confirmed in March as director of the United States Patent and Trademark Office after a couple months' uncertainty as to whether she would continue in the role following Trump's inauguration—recently formed the Regulatory Reform Task Force resulting from that executive order. The office has not released the names of those on the task force, which is to submit a progress report by May 25.

It would seem extraordinarily beneficial if the USPTO task force started its work with this common-sense recommendation: Regulations that inhibit the issuance and existence of patents should be repealed.

But those who seek the demise of the patent system will never believe that patents are responsible for economic advantage, job creation or lead to high-paying jobs. So let's start there first in an attempt to make it impossible for even those nay-sayers to honestly question the veracity of these claims. Obviously, what follows is not exhaustive proof; but for fair-minded and rational thinkers, it will provide support for what we in the industry know to be true.

2012 USPTO report

A 2012 report by the USPTO titled "Intellectual Property and the U.S. Economy" concluded that patents are critical for job creation. Its Summary explained:

"Innovation protected by IP rights is key to creating new jobs and growing exports. Innovation has a positive pervasive effect on the entire economy, and its benefits flow both upstream and downstream to every sector of the U.S. economy. Intellectual property is not just the final product of workers and companies—every job in some way produces, supplies, consumes, or relies on innovation, creativity, and commercial distinctiveness. Protecting our ideas and IP promotes innovative, open, and competitive markets, and helps ensure that the U.S. private sector remains America's innovation engine."

That report also concluded that IP-intensive industries support a total of 40 million jobs, or 27.7 percent of all jobs in the economy, and contributed approximately $5 trillion, or 34.8 percent, to the U.S. gross domestic product in 2010. Focusing specifically on patents, the report said that patent-intensive industries specifically supported 3.9 million direct jobs and indirectly supported another 3.3 million workers in 2010. Patent-intensive industries also made up 5.3 percent of GDP, accounting for about $763 billion.

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2016 USPTO report

Last year, the USPTO released an update on the 2012 report. It begins by stating the obvious: "Innovation and creative endeavors are indispensable elements that drive economic growth and sustain the competitive edge of the U.S. economy." The Executive Summary adds: "IP-intensive industries continue to be an important and integral part of the U.S. economy and account for more jobs and a larger share of U.S. gross domestic product (GDP) in 2014 compared to what we observed for 2010."

The report also concluded that IP-intensive industries support a total of 45.5 million jobs (up from 40 million in 2010), or about 30 percent of all jobs in the economy, and contributed approximately $6.6 trillion, or 38.2 percent, to U.S. GDP in 2014—an astonishing increase of nearly $1.6 trillion from only four years earlier.

Focusing specifically on patents, patent-intensive industries specifically supported 3.9 million direct jobs and indirectly supported another 3.5 million workers in 2014. Patent-intensive industries also made up 5.1 percent of GDP, accounting for about $881 billion. It is perhaps interesting to note that although the percent of GDP decreased relative to patent-intensive industries, the raw dollar total increased by $118 billion as compared to four years earlier.

Furthermore, workers in non-IP-intensive industries earned an average of $896 per week, but those in patent-intensive industries earned $1,560 per week.

Significant percentages of venture capital firms place a premium on patents when making funding decisions. But since it is so unlikely that VC funding will be acquired, why would anyone want to make it more difficult by ignoring patents?

Importance of VC funding

Mario W. Cardullo is a distinguished engineer and someone who knows a thing or two about innovation, inventing and entrepreneurship. Cardullo has been a founder or principal in various technology companies and is the inventor of one of the basic patents for the RFID-TAG devices (i.e., E-ZPass), for which he was nominated for the Lemelson-MIT Prize (2003) and the Presidential National Medal of Technology (2004). In an essay titled "Intellectual Property—The Basis for Venture Capital Investments," he wrote:

"One of the major problems faced by new technology seed and start-up enterprises is access to the first round of funding, either through debt or venture capital investment.

"Venture capitalists want to know where an invention or innovation fits in the marketplace with reference to existing and

potential competitors. The potential investors also want to know if the invention or innovation offers a dramatic and sustained advantage, and whether there is compelling evidence to warrant building a business based on the invention or innovation. They seek to evaluate both the strength of an innovation and the ability of the entrepreneur to motivate commercialization…

"One of the most important issues evaluated by venture capitalists is the security of intellectual property. Normally, a strong patent position is desired and the issues of ownership of intellectual property need to be well understood."

Obtaining funding from venture capitalists matters greatly. Roughly 600,000 new businesses launch in the United States each year, with about 1,000 new businesses receiving their first venture capital funding. What that means is that .167 percent of new business receive venture funding. So the deck is enormously stacked against you if you are planning on starting a business and raising venture capital.

According to a patent survey conducted by the University of California, Berkeley Law School, many investors place a premium on patents when making investment decisions. In fact, 67 percent of firms surveyed indicated that the existence of patents was an important factor in their investment decisions. Seventy-three percent of VCs indicated a premium on the existence of patents before investing in biotech companies, 85 percent for medical device companies. Sixty percent of VCs even indicated placing a premium on patents before investing in software companies.

System gets in the way

So it doesn't matter what industry you are in; significant percentages of VCs place a premium on patents when making funding decisions. But since it is so unlikely that VC funding will be acquired, why would anyone want to make it more difficult by ignoring patents?

Venture-backed funding can be critically important for a company that wishes to go public. VC-backed companies have consistently made up a large percentage of firms that go into an Initial Public Offering (IPO); that percentage reached a high of nearly 60 percent during the dot-com era. Given the importance of venture capital and the strong preference for patents VCs have, it starts to become clear how and why patents play such an enormous role in the U.S. economy. The importance is further underscored by IHS Global Insight research that says 92 percent of the job growth for young companies occurs after their initial public offerings.

So if we want large numbers of those high-paying jobs in patent-intensive industries, we need to get companies to IPO,

Laches Ruled No Defense to Patent Infringement

EXPECTED DECISION BY SUPREME COURT IS PRO-PATENT BY GENE QUINN

On March 21, the United States Supreme Court ruled in *SCA Hygiene Products Aktiebolag et al. v. First Quality Baby Products, LLC, et al* that laches cannot be invoked as a defense against a claim for damages in a patent infringement case brought within the six-year statute of limitations set forth in the U.S. Patent Act. Laches is an unreasonable delay in making an assertion or claim.

The same ruling was reached in 2014 in *Petrella v. Metro-Goldwyn-Mayer, Inc.*, with respect to laches as a defense in copyright infringement claims.

The case involved a dispute over a patent for adult incontinence products. SCA Hygiene, the plaintiff, accused defendant First Quality of infringement in October 2003 but did not file suit until August 2010—almost seven years later. The district court and a panel for the United States Court of Appeals for the Federal Circuit held that SCA's delay in filing suit was unreasonable and that laches therefore barred SCA's claim for pre-suit damages. These included damages for infringement occurring within the patent act's six-year damages limitation period.

But the 7-1 Supreme Court decision, delivered by Justice Samuel Alito, vacated the federal circuit's ruling and eliminated what had been an important tool used by accused infringers to fight delayed infringement claims. A dissent was filed by Justice Stephen Breyer, who would have affirmed the federal circuit ruling finding that U.S. patent law codified a laches defense without using the term "laches."

This case was hardly difficult to predict. Justice Alito explained, in a rather exasperated way, that the federal circuit seemed to ignore previous Supreme Court pronouncements that laches could not be used as a defense to a claim brought during the statute of limitations period because those cases did not specifically deal with a claim of patent infringement.

First Quality did make an interesting argument about the six-year statute of limitations for patent infringement actions not being a true statute of limitations because it counts backwards from the filing of the complaint, rather than forward from the date of infringement. The importance of this nuance seemed completely missed on the majority; only Justice Breyer seemed to understand the

which requires an attractive ecosystem for VCs in which to operate. This means a strong, vibrant patent system that will attract investors to engage in the speculative investing necessary to fund those risky, exciting young companies.

Onus is on Trump

If you are not blinded by an agenda, you must recognize that patents are linked to economic success, job growth and high-wage jobs. If President Trump is serious about making America great again and dismantling the regulatory bureaucracy that stands in the way of those individuals and companies that will lead America to the 4 percent growth he wants, he will demand the USPTO again become a patent-friendly agency. In particular, it is time for the USPTO to lift the foot off the throat of certain sectors of the biotechnology community and pretty much the entire software industry. It is well past time for the USPTO to stop acting as an arms dealer by selling patents (which takes many years to achieve) and patent challenges.

There are a great many regulations—as well as interpretations of cases from the Supreme Court and United States Court of Appeals for the Federal Circuit—that directly and unambiguously inhibit the issuance of patents or make them quite easy to challenge (or harass). The Patent Trial and Appeal Board's very existence is for the express purpose of providing a forum to kill patents. Of course, the PTAB itself is a legislative creation, but the decidedly anti-patent manner in which the proceedings are conducted could be changed with executive action. Furthermore, since the PTAB judges are not independent (i.e., they report to the director of the USPTO), philosophical and ideological change could be made with relative ease if there is the political will to see it through.

President Trump would do well to take a page from President Reagan's book when he fired the air traffic controllers on strike. Why shouldn't President Trump fire all of those patent examiners who have for years not issued a patent? Perhaps they are not "technically" on strike, but they are obviously engaged in some kind of game playing or work slowdown akin to a strike; they continue to be paid, receive bonuses and benefits; and they haven't seen a patent application in years and years worth issuing—not even in art units completely dominated by the likes of Google, Microsoft, Apple and other tech giants.

President Trump may well be politically naive, but this can be done. Will this anonymous Regulatory Reform Task Force actually make suggestions calculated to lead to economic growth for the United States? Will the patent office have the political will to actually follow through with both the spirit and intent of the executive order? Time will tell.

importance of the argument. Of course, without a laches defense possible, a patent owner could lie in wait for infringement to become widespread and then sue for infringement, seeking only the previous six years worth of damages.

Although I doubt the Supreme Court really understands what it did, the fact that laches cannot be used as a defense to a patent infringement action brought during the statute of limitations is definitely a pro-patent decision. Presently, patents are much weaker than they have been at any time in the past 36 years. But patent law has always swung like a pendulum, and this low point will not last forever.

Thus, in the wake of the Supreme Court's decision in *SCA Hygiene*, patent owners would do well to consider forgoing patent enforcement. Instead, allow infringement to accrue and then sue for infringement in several years when the law may be quite a bit more favorable. After all, patents can last for 20 years, the statute of limitations is six years, and without a laches defense available to infringers you will be able to seek damages going back six years from whenever you choose to sue.

Interesting comments

A couple of comments caught my attention in this case. First, in the majority opinion, Justice Alito wrote: "[A]pplying laches within a limitations period specified by Congress would give judges a "legislation-overriding" role that is beyond the Judiciary's power."

The Supreme Court never seems to be bothered with "legislation-overriding" when applying its extra-statutory requirements for patent eligibility. U.S. Code Title 35, Section 101 specifically says that if a claim is directed to a machine, process, manufacture or composition of matter, the claim is patent eligible. But without any statutory support for doing so or any support in the Constitution, the Supreme Court has added two additional inquiries through what it refers to as the *Alice/Mayo* framework created by those landmark cases. It is interesting that the Supreme Court at times can so correctly understand the role of the judiciary and at other times completely ignore separation of powers, ignore Congress and the statutes it passes and do whatever it wants.

Second, in his dissent, Justice Breyer wrote: "I would be more cautious before adopting changes that disrupt the settled expectations of the inventing community." But settled expectations meant nothing to Justice Breyer, or any of the other Supreme Court justices, when they decided *AMP v. Myriad Genetics* in 2013. Although the Supreme Court clings to the fiction that *Myriad* did not overrule the landmark *Diamond v. Chakrabarty* case in 1980 (in which a live human-made microorganism was ruled patentable subject matter), there is no way to interpret Myriad in any other way than overruling the settled expectations that had been understood by the industry for more than 30 years.

The decision vacated a federal circuit ruling and eliminated what had been an important tool used by accused infringers to fight delayed infringement claims.

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It could happen

A 760 m.p.h. train? PayPal, Tesla and SpaceX founder **Elon Musk** says it could be ready within a few years. His Hyperloop system would propel passengers through a vacuum tube fueled by compressed air and induction motors.

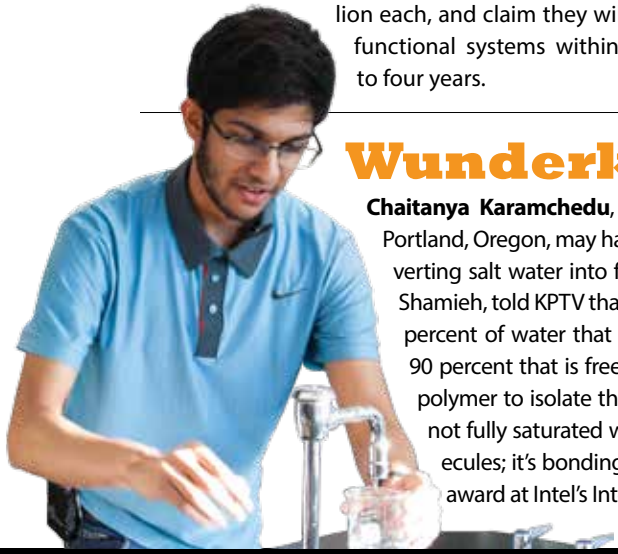
The system would shrink the train commute from San Francisco to Los Angeles to 35 minutes, compared to the current 7.5 hours.

Musk says the system would be faster and cheaper than trains, boats, cars and planes for up to at least 900 miles, and that it would be resistant to earthquakes while generating energy through solar panels. The system would also run without emitting harmful chemicals.

Two start-up companies that have started working on this technology have raised more than $100 million each, and claim they will have functional systems within three to four years.

What IS that?

The **Agonose Arm** leaves your human hands free while providing support for your jaw, or as a head pillow. (Think airports and on airplanes.) It also professes to help you sit up straight. Although Amazon.com lists many products by Thanko, the Japanese retailer that makes the arm, the online market behemoth currently does not sell it. Meanwhile, you can always head over to Ancestry.com and investigate whether our featured novelty is any relation to the Hamburger Helper hand.



Wunderkinds

Chaitanya Karamchedu, a senior at Jesuit High School outside Portland, Oregon, may have found the long-elusive answer to converting salt water into fresh drinking water. His teacher, Dr. Lara Shamieh, told KPTV that scientists have always focused on the 10 percent of water that is bonded to the salt in the sea, not the 90 percent that is free. Experimenting with a highly absorbent polymer to isolate the saltwater, Chai found that "Sea water is not fully saturated with salt. It's not bonding with water molecules; it's bonding to the salt." His discovery won a $10,000 award at Intel's International Science Fair.

1 ton

The amount of weight that can be supported by one piece of **Velcro** less than 5 inches square, according to the invention book "They All Laughed… From Light Bulbs to Lasers" by Ira Flatow. Sciencing.com says nylon Velcro fasteners can open and close 10,000 times, while polyester Velcro fasteners have a lifespan of 3,500 before deteriorating. Velcro was trademark registered on May 13, 1958.

WHAT DO YOU KNOW?

1 **True or false: Director Francis Ford Coppola patented a T-shirt with a numbered, turtle-shaped grid on the back to make it easier to identify the precise spot on his back that needed scratching.**

2 **True or false:**
You can't patent a plant.

3 **Elijah McCoy, the African-American inventor born May 2, 1844, who had 57 patents, is best known for which innovation?**

A) Lubrication devices for train travel
B) A refinement for the cotton gin
C) A water purification method
D) None of the above

4 **"Take Me Out to the Ball Game," registered on May 2, 1844, by Albert von Tilzer, has *not* been recorded by which artist?**

A) Carly Simon **B)** Paul Simon
C) Dr. John **D)** Goo Goo Dolls

5 **Which device was patented first—an ice-making machine, or a fire escape ladder?**

ANSWERS

1. True. We like to get inventive with these questions, but c'mon. 2. False. This right was stipulated in the Patent Act of 1930, which became law on May 23 of that year. According to the United States Patent and Trademark Office: "A plant patent is granted by the Government to an inventor (or the inventor's heirs or assigns) who has invented or discovered and asexually reproduced a distinct and new variety of plant, other than a tuber propagated plant or a plant found in an uncultivated state." 3. A. 4. B. 5. John Gorrie received a patent for the first ice-making machine on May 6, 1851; Joseph Winters got his patent for the fire escape ladder on May 7, 1878.

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