

Inventors

SEPTEMBER 2015 Volume 31 Issue 09

DIGEST

Standing On The Shoulders Of Giants

LOOK TO THE PAST
FOR FUTURE SUCCESS

Eye On Washington

CHANGES AT THE USPTO

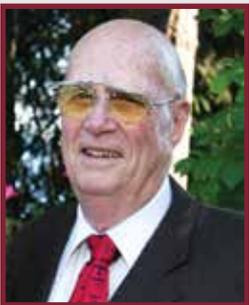
The Perfect FIT

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Bird Man

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Imprints and Footprints

Inventors innovate for a variety of reasons; chief among them is problem solving, which can have either selfish or altruistic goals. Dr. Forrest Morton Bird, with his sights set on easing pain and suffering, was the quintessential humanitarian inventor. Bird, who passed away August 2, 2015, spent most of his 94 years on Earth researching and developing products that helped millions of people breathe easier, saving as many lives in the process.

While Bird tinkered his entire life, even building tractors from Model T parts as a young boy, his first revolutionary invention was the Anti-G Pressure Suit Regulator, which enabled American pilots to safely ascend to greater heights, giving them an advantage in World War II dogfights. After the war, Bird's research led to the first reliable, portable respirator and the subsequent development of dozens of respirator/ventilator life-saving devices.

When he wasn't working, the experienced aviator was in the air, bound to Earth only by the pull of gravity. One has to wonder if a man named Bird, who believed that "life is fate, time and circumstance" was destined for flight—and the ensuing theories that led to his inventions. It seems human lungs and airplane wings have more in common than we might imagine.

Some inventions leave a smaller imprint on the world, as does Julie Lopez's FIT, although many women might argue that point. Lopez's innovative technology makes it easier for women to wear high heels. With assistance from an American product developer and an Italian shoe designer, Julie Lopez Shoes entered the competitive shoe market in 2012. Forgoing the retail route, Lopez takes advantage of social media and a website to generate interest in her shoes. A little help from Oprah Winfrey didn't hurt, either. Lopez's shoes made the January 2015 O List in *O The Oprah Magazine*.

If your eye is on Washington, you're most likely aware of changes that took place over the summer at the United States Patent and Trademark Office. If not, be sure to read the latest from *Inventors Digest* contributor Gene Quinn. Peggy Focarino retired in June as the Commissioner of Patents, and Drew Hirshfeld, former Deputy Commissioner for Patent Examination Policy, took over her role. Look forward to an interview with Hirshfeld in the October issue. A change also occurred at the United States Court of Appeals for the Federal Circuit, when Judge Kara Stoll took the oath of office July 17, filling a seat vacated by the retirement of Judge Randall.

"Podcast." No one had heard the term in 2003, when *Radio Open Source* debuted. Twelve years later, podcasts are a part of mainstream media and cover almost every topic imaginable—including inventions and entrepreneurship. Learn from the masters while being entertained, as Jeremy Losaw reveals his favorites.

In order to produce a quality magazine that meets the needs of readers, we are trying to have a better understanding of who is reading *Inventors Digest*—and why. Please take the time to complete the readership survey on page seven. The survey is also available on our website: www.inventorsdigest.com.

Thank you for your continued support. — Cama McNamara

**DREAM
SMALL**

**DISCOVER NOTHING
IMAGINE LESS
DO WHAT'S BEEN DONE**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
**INSPIRE NO ONE
GIVE UP HOLD BACK**

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★
INVENT NO MORE

IGNORE YOUR HEART | **SHOOT FOR AVERAGE
THINK NEGATIVE
REACH FOR THE GROUND**

IF CONGRESS PASSES LEGISLATION WEAKENING PATENT PROTECTION, THE MESSAGE TO INVENTORS IS, "WHY BOTHER?" SO WHAT INVENTIONS WON'T BE INVENTED? WHICH START-UPS WILL GET KILLED BY FOREIGN COPIERS BEFORE THEY GET STARTED? WHOSE JOBS WILL GET SHIPPED OVERSEAS? VISIT SAVETHEINVENTOR.COM AND TAKE ACTION TO HELP PRESERVE U.S. INNOVATION AND ECONOMIC GROWTH.



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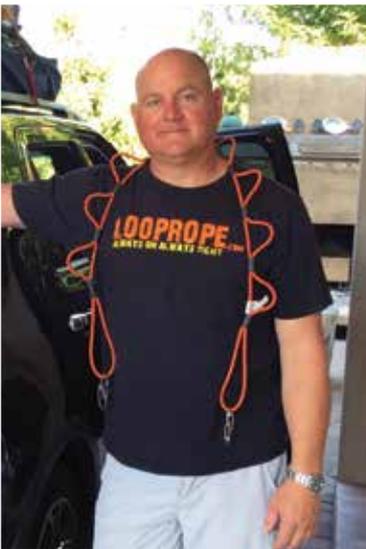
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Julie Lopez,
photographed by
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READERSHIP SURVEY

Inventors Digest is conducting a readership survey to determine who is reading the magazine and to define topics of importance. We would appreciate your taking a few minutes to complete the following survey. Five entries, selected at random, will receive a complimentary one-year subscription to **Inventors Digest**.

Age:

- Under 25 25-34
 35-49 50-64
 65 +

Gender:

- Male Female

Annual Household Income:

- Under \$35,000
 \$36,000-\$55,000
 \$56,000-\$90,000
 \$90,000-\$125,000
 More than \$125,000

Level of Education:

- High School or GED
 Some College
 College Graduate
 Postgraduate Degree

How often do you typically read *Inventors Digest*?

- Every month
 Most months
 Occasionally

How long do you typically keep an issue of *Inventors Digest*?

- More than one year
 More than three months
 One month or less

How much time do you spend reading *Inventors Digest*?

- 60 minutes or more
 30 to 59 minutes
 1 to 29 minutes

Do you prefer to read *Inventors Digest*

- In print
 Online
 Both

If there were additional content from *Inventors Digest* available only online, how likely would you be to go to the website and read it?

- Not likely
 Somewhat likely
 Very likely

Please check the following that apply to you:

- I have a great idea, but, as of today, it is only an idea.
 I am developing one invention.
 I am developing more than one invention.
 I have a patent pending on my invention.
 I am a patent owner.
 I own more than one patent.
 I look to *Inventors Digest* for help with my invention.
 I would like to see more advertisers in *Inventors Digest* that can help me develop my product.

Fill in the blanks:

I have been an *Inventors Digest* subscriber for ___ years.
 ___ people read each issue?

Each month I read the following:

I would like to see more articles on:

I would like to see fewer articles on:

My favorite part of the magazine is:

My least favorite part is:

Please rate the following:

	EXCELLENT	GOOD	AVERAGE	POOR	NO OPINION
Content	<input type="radio"/>				
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Ease of Reading	<input type="radio"/>				
Layout and Design	<input type="radio"/>				
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Writing	<input type="radio"/>				

(Continued on back)

READERSHIP SURVEY CONTINUED

What actions have you taken on your invention(s) as a result of reading *Inventors Digest*?

What article or topic would you consider to be the most memorable in the last year?

Are there any changes or improvements you would like to suggest?

Please take a few minutes to describe topics you would like to read about in *Inventors Digest*:

Name: _____

Address: _____

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Return to: Cama McNamara • Editor-in-Chief • Inventors Digest • 520 Elliott Street • Charlotte, NC 28202

The survey is also posted on the *Inventors Digest* website: InventorsDigest.com.



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www.lily.camera

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“We're all innately creative; I'm not bringing anything magical to it. Ninety percent of inventing is putting in the hours and just trying. You don't need to make a big leap—you need to take a thousand small steps.” — JAMES JORASH



Onewheel
SKATEBOARD TAKES ON SEGWAY

rideonewheel.com

Skateboarding just got a little cooler—thanks to the One-wheel electric skateboard. Powered by a motor and fitted with a singular tire in the center of the board, Onewheel’s electronic sensors detect the way the user is leaning, effortlessly propelling the skateboard forward, while giving the rider the sensation of flying. Advanced sensors and electronics provide a totally smooth riding experience, and Onewheel is nimble enough for the rider to perform skateboarding tricks. Onewheel’s top speed peaks at 12 miles per hour, and it has a range of up to six miles with a full charge. The device incorporates LED lighting for night riding, has multiple riding modes, and is even compatible with several Android apps via Bluetooth. — *Zach Rachuba*

Autonomous Desk
RISES TO THE OCCASION

autonomous.ai

Autonomous Desk is a smart office desk that automatically gives you a healthier way to work. The desk senses your arrival in the morning and automatically rises to your preferred standing height. After you’ve changed the desk height several times, it learns your habits and adjusts its height—from standing to sitting—and back again—as a natural part of your day to help you be active while you work. If you’ve been sitting for hours, the desk proactively reminds you to stand up.

Autonomous Desk also comes with a voice-activated personal assistant that allows you to access a variety of apps and get the day’s tasks done quickly and conveniently. Order a chicken salad, schedule a meeting, find a restaurant, call a taxi or ask for information.

The desk can control compatible devices in your office such as the thermostat, lights or automatic door. Special features include a wireless charging pad, USB charger, speaker, and a bag and key hanger. The design is simple, and the top comes in several finishes, including oak, walnut, solid white, solid black or bamboo. Autonomous Desk is currently available on Kickstarter with a basic price of \$399. The extra-large model is \$599, and a monitor stand, \$49.

— *Cliff McNamara*



Light Phone
BACK TO THE BASICS

thelightphone.com

Smartphone owners who may not want the rings, dings and pings associated with email, voice-mail and numerous other distractions will enjoy Light Phone, which is designed to be used as little as possible. The slim, credit card-sized phone works as a stand-alone phone or with an app on your existing phone. The interface is stripped down to the most basic functions.

Light Phone allows the user to make calls for up to 20 days without charging, and it easily fits into a wallet. Light Phone can synch with your existing phone to forward calls and store up to 10 numbers on speed dial. The device works independently of your carrier as a pre-paid phone. An unlimited plan is also offered. Light Phone is a great backup when your smartphone dies or is a perfect first phone for children. Light is available for the pre-order price of \$100, which includes the charger, SIM and 500 prepaid minutes. Light phone will begin shipping June 2016.

— *Cliff McNamara*



Crash Sack

WAKE UP AND GO

rei.com

Waking up at a campsite in cold weather is not much fun, but the Crash Sack, a sleeping bag cum puffer coat, will make mornings in the wilderness bearable. You don't even have to crawl out of your sleeping bag to light your camp stove. The bottom of the sleeping bag unzips, and the bottom can be clipped up so that the wearer can walk around in it easily. Crash Sack has arm holes for easy maneuvering, which are covered by shoulder flaps to minimize heat loss. The bag has a hood for added warmth and internal pockets to store a cell phone or other creature comforts. Crash Sack is rated to 45 degrees F and is available in three sizes at REI for \$119. —Cliff McNamara



Pop Quiz

Which of these was the Frisbee at one time called?

- A. Whirl Away
- B. Flying Saucer
- C. Pluto Platter
- D. All the above

If you guessed "all of the above," you're correct.

Before becoming a World War II pilot, Walter F. Morrison and his friends discovered that, with the help of a strong breeze, they could toss popcorn can lids to each other on the beach. As a pilot during World War II, Morrison learned about aerodynamics, and after the war, he revisited the flying lid.

Morrison developed a toy he first called a Whirl Away, which didn't sell, so the name was changed to Flying Saucer, and later, to Pluto Platter. In 1957, when Morrison found out that students at Yale were calling the disk "Frisbee," because it looked like a pie tin from the local Frisbee Bakery, he changed the name again, and the flying disk began spinning around the world. —Cama McNamara

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nipi

COOLER CHARGE

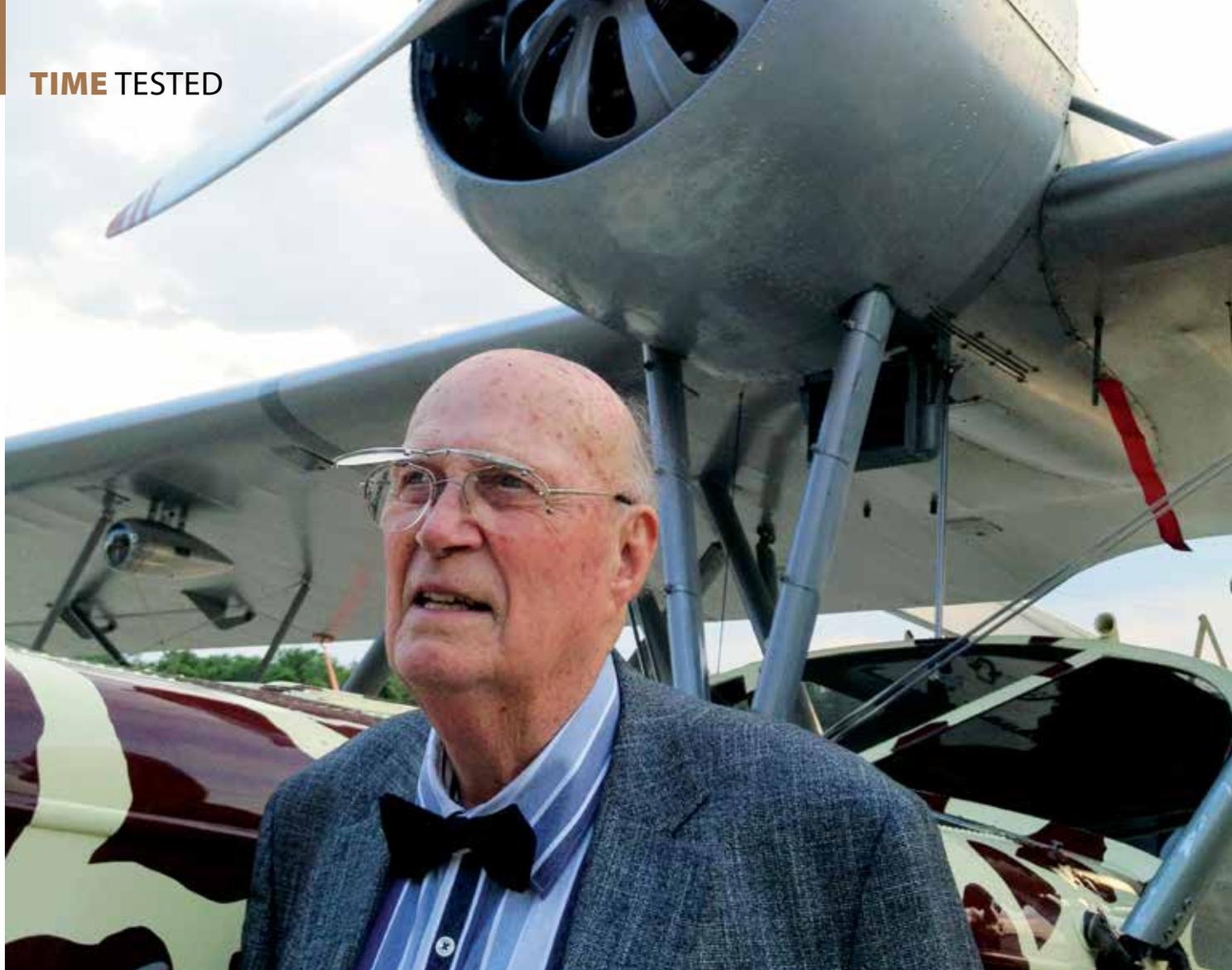
nipicoolers.com

What could be cooler than a cooler that not only keeps food and beverages cold, but also boasts a charging hub and security box, as well as cool LED lighting? Consider the nipi Smart Cooler for your next lengthy camping trip.

The cooler can keep ice frozen for up to six days and has 50 quarts of cold storage space, which can accommodate around 70 cans. Electronic devices such as smartphones and Bluetooth speakers can be charged through the two external USB ports, which are powered by high-efficiency solar panels. The panels deliver up to 6W of power each and are used in pairs to power external and internal LED lighting, as well as electronic devices.

A 14,000 mAh lithium polymer battery charges in approximately seven hours through the solar panels. A fully juiced single battery is capable of charging a smartphone seven times over. Touted as a cooler with 21st century survival features, nipi also offers the basics, such as cup holders and a cutting board. The oversized wheels are made for all-terrain travel, and the lightweight design makes it easy to transport. nipi is available for pre-order through Kickstarter for \$195. Orders begin shipping in March 2016. The anticipated retail is \$450.

—Cliff McNamara



Bird Man

Dr. Forrest M. Bird Soared Through Life

The invention community lost a monumental member with the passing of Dr. Forrest M. Bird on August 2, 2015. Bird was an American icon, whose tinkering with strawberry-shortcake tins, door knobs and a metering device led to a respirator that made high-altitude flying possible—and subsequent inventions that saved millions of lives.

Bird often said that “life was fate, time and circumstance,” three pillars he used to advantage each day. Bird’s vast knowledge and work spanned multiple disciplines, as his academic titles—M.D., Ph.D., Sc.D. and D.S.—suggest. Bird was recognized

the world over as an innovator, aviator, entrepreneur, professor, scientist, veteran, physician and humanitarian.

In a recent interview, Bird’s wife, Dr. Pamela Riddle Bird, said that although her husband’s death was a tremendous personal loss, the greater loss was that of “one of the most incredible inventors and humanitarians who ever lived.”

Taking Flight

Born on June 9, 1921 in Stoughton, Mass., Bird grew up around the family machine-shop business and, as a result, developed an early affinity for engineering and innovation. Family friend Henry Ford was

impressed by the young boy who built tractors and corn huskers from Model T parts.

Bird was also passionate about aviation. His father, a former World War I combat pilot, gave his young son flying lessons, and when Bird met aviation luminary Orville Wright, his fate was sealed.

Through an accelerated academic program, Bird graduated from high school at age 14, the same year he performed his first solo flight. By the time he enlisted in the Army Air Corps a week after the Japanese bombed Pearl Harbor in 1941, Bird was an experienced pilot.

He entered active duty as a technical air training officer, with a variety of duties that

Bird said of all his inventions, the Baby Bird®, a respirator designed for infants, was his most significant contribution to medicine. The Baby Bird has been given credit for saving thousands of premature babies born with underdeveloped lungs. After it was introduced in 1970, infant mortality rates from respiratory problems dropped from 70 percent to less than 10 percent.

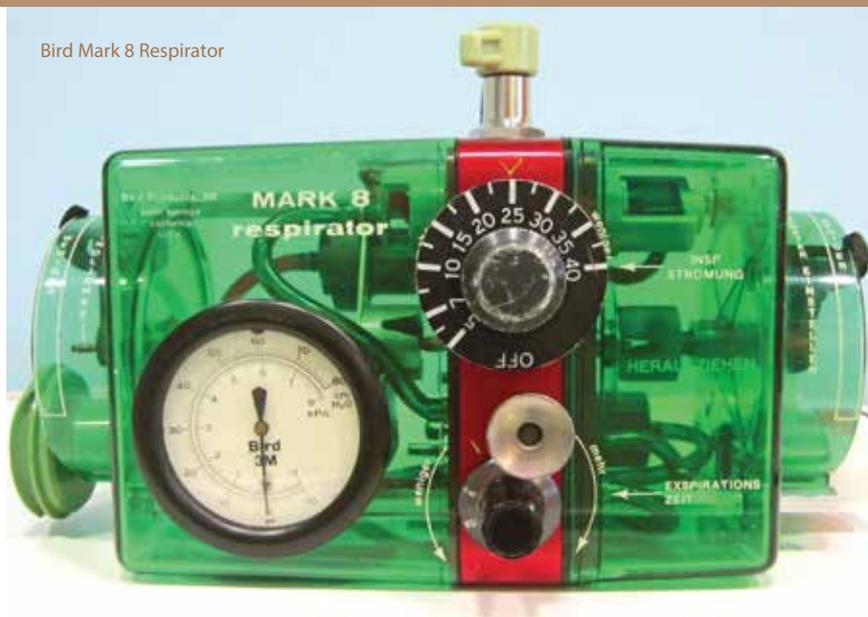
gave him the opportunity to pilot most aircraft in service. For a time, he was General Patton's pilot, but Bird wanted his own assignments. He studied aeronautics and ferried bombers, fighters and transport planes from aircraft factories to airfields across the United States, as well as to operational squadrons in Europe, the Pacific and Asia.

During the war, Bird's study of high-altitude respiratory problems—combined with the capture and resulting modification of a German regulator—led to Bird's Anti-G Pressure Suit Regulator, which enabled pilots to climb to 40,000 feet, giving Americans an advantage in dog-fights. Bird later said that his research during the war proved invaluable when he began designing biomechanical medical devices, recalling that as he flew, he examined the similarities between the way air flowed over the wings of a plane and how it moved through the human lungs. Bird later applied these principles to his medical devices.

Breathe Deep

After the war, Bird settled in Palm Springs, Calif., where he studied medicine and completed diverse residencies with an emphasis on curricula that impacted his work. Much of Bird's formal higher education, however, was completed later in life, when he earned four doctorates. Bird received his Doctor of Science in aeronautics from Northrop University in Inglewood, Calif., in 1977 and a Doctor of Medicine from the Pontifical Catholic University of Campinas in Brazil in 1979. He also obtained a Ph.D. in physics and a Doctor of Science in biotechnology. "He could talk to anyone in the world about any subject," Pamela relates.

In 1946, Bird designed the Positive Pressure Inhalation Device, followed in



Bird Mark 8 Respirator

STEFAN BELLINI / WIKIMEDIA COMMONS / PUBLIC DOMAIN

1950 by the first prototype of the Bird Respirator, which enabled the latest aircraft to exceed altitudes at which humans could breathe normally, reducing the risk of pilot hypoxia.

But, it was the Bird Mark 7 that impacted the world beneath the skies. These devices were the first portable, reliable, low-cost respirators in the world. The Bird Mark 7 eventually replaced archaic and expensive mechanisms like iron lungs, which at the height of the polio epidemic only a decade before had lined hospital wards. Formally known as the Bird Universal Medical Respirator, the device completely transformed the field of respiratory medicine.

"At first, physicians were skeptical of the device," says Pamela. "They said, 'A machine that breathes for you; that is never going to happen.'" But it did.

The Mark 7 was initially tested on patients who had little chance of survival, but as Bird continued to make improvements, more lives were saved. In 1967, Bird once again took to the air, when he developed

the Bird Innovator, a converted Consolidated PBY Catalina amphibious aircraft, to fly around the world teaching physicians how to use his respirator. The "little green box," as it was known, became a familiar sight in hospitals around the world.

"I work as if I were going to be the next person to need a respirator," Bird told *The Associated Press* in a 1981 interview. "I share in the benefits I bestow on others, and my work has enriched my life."

Baby Bird

Bird, who retired from the Army as a Colonel, was involved in both the Korean and Vietnam wars. Pamela says that her husband was a true patriot, who admired soldiers and veterans, and believed that the United States is a true land of freedom and opportunity.

It was Bird, who during the Vietnam War, developed intensive care transport, or modern-day Medevac. Today, Medevac is a critical component of retrieving wounded soldiers from the battlefield, as well as

TIME TESTED

transporting patients from the scene of an accident.

Bird's inventions were also vital to the world's first open-heart surgery and first liver transplant, but in a 1977 interview with Morley Safer for *60 Minutes*, Bird said of all his inventions, the Baby Bird®, a respirator designed for infants, was his most significant contribution to medicine. The Baby Bird has been given credit for saving thousands of premature babies born with underdeveloped lungs. After it was introduced in 1970, infant mortality rates from respiratory problems dropped from 70 percent to less than 10 percent. Even Pamela's daughter, Rachel, was saved by a Baby Bird.

Landing Field

To manufacture and market the burgeoning number of medical devices he was developing, Bird founded Bird Oxygen Breathing Equipment, Inc., later named Bird Corporation. After selling Bird Corp to 3M in 1979, Bird moved to Sagle, Idaho, where he bought a pastoral 300-acre estate on Lake Pend Orielle—but his life was far from tranquil. The estate was also home to the newly founded Percussionaire Corporation, where dozens of employees developed and marketed Bird's inventions. Bird often worked long hours, taking time to fly one of his many planes three or four mornings each week.

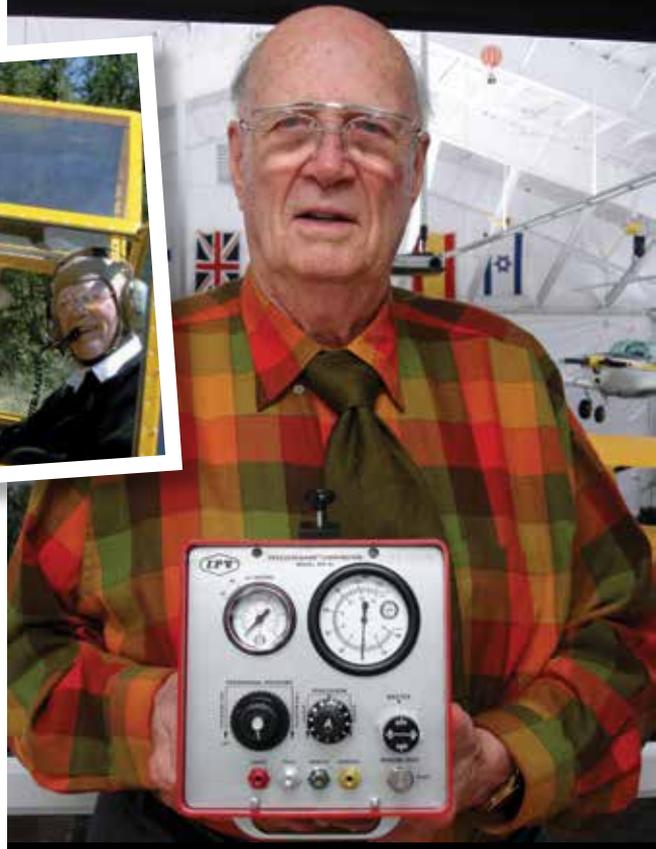
The property also included a working farm that sustained the residents, and an airfield and hangars for the scores of restored vintage airplanes, helicopters, cars and motorcycles Bird had collected. Bird continued to innovate his entire life and, in his final years, held more than 200 patents, with many others pending. In fact, if you visit the Percussionaire website, you'll see Bird's latest product, the Travel Air™, which will soon be ready for "take off."

Bird and Pamela met at a conference in Orlando, Fla., in 1995. An innovator in her own right, Pamela's company, Innovative Product Technologies, Inc., was holding a conference in conjunction with the United States Patent and Trademark Office. Bird had just been inducted into the National



“Old pilots don’t die, they get a new set of wings.”

—DR. PAMELA BIRD



Dr. Forrest Bird with an IPV1C respirator unit.

Inset: Forrest Bird and wife, Pamela, take flight on a Beechcraft airplane from the Bird Ranch Airstrip in Sagle, Idaho.

Inventors Hall of Fame, and the USPTO requested that Pamela add Bird to the list of speakers. Pamela already had notable speakers lined up and at first resisted, because she was not familiar with Bird, nor his accomplishments. Bird gave a brilliant lecture that day, and Pamela eventually discovered the two had much in common. They were married in 1999.

Pamela says that the couple's lives were not affected by the 36-year age difference. "Imagine sitting down with one of the most brilliant men on Earth, who had traveled the world and lived through the Industrial Revolution and the technological

revolution; a man who would sit down and take his new Apple computer apart and put it back together, just to see how it worked. Living with Forrest was like living with the Internet—not Siri—Siri asks the Internet questions. He could discuss any subject, any time, worldwide: religion, politics, geography, history, science, aviation, physics, astronomy, fishing, cooking,

Awards and Honors

An unpretentious man, Bird wore New Balance running shoes with his tux at black-tie events, including the times he was honored at the White House by two United States presidents. Although his accolades are too numerous to name, following are a few of the most significant.

1985 and 2005: Winner of the Lifetime Scientific Achievement Award

1995: Inducted into the National Inventors Hall of Fame

2007: Inducted into the Living Legends of Aviation

2008: Inducted into the Idaho Aviation Hall of Fame

2008: Received the Presidential Citizens Medal from George W. Bush

2009: Awarded the National Medal of Technology and Innovation from President Barack Obama

2012: Received the Charles Lindbergh Award

2012: Inducted into the Idaho Technology Hall of Fame

genetics, etc. Ask him any question, and the vast majority of the time, he knew the answer. As his final flight drew near, I realized that if I only knew 1/100 of what this 94-year-old gentleman had forgotten, I might consider myself smart.

“This same man was also the quintessential gentleman. Forrest was concerned about doing his absolute best for mankind. He always said, ‘Blood bleeds red.’ Discrimination was not part of his vocabulary.”

During their years together, the couple traveled to more than 60 countries, teaching and lecturing. “He had the ability to speak on all levels,” says Pamela. “He could speak to a kindergartner as well as he could converse with a scientist, which is genius in itself.”

A Legacy of Innovation

To further the cause of innovation, the couple opened the Bird Aviation Museum and Invention Center on the property in 2007. The facility strives to “educate visitors about the historic contributions of aviators and innovators who have helped create modern technology, and celebrate these individuals who have forever changed the way we live. It only takes one person to change the world.”

Pamela says that by the time her husband was 88, he slowed down to working 14-hour days, which were filled with developing new technology; running his business; talking to employees and distributors; traveling; pitching hay, and, of course, flying. At 91, Bird still enjoyed helicopter maneuvers.

Pamela says she and Bird worked as a team outside the office, too, canning salsa and over 300 jars of jelly each year, made from the fruits and vegetables grown on the farm.

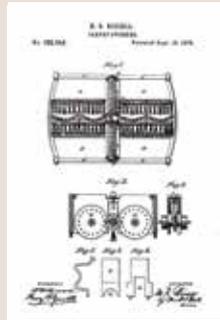
In his later years, Bird spent countless hours touring schools and encouraging students of all ages to develop a sense of innovation. “That was a priority for him,” Pamela says. “He told them that inventors change the world—and that it could be them. They had the power, the creativity, the ingenuity and talent to make a difference in the world.” Who would know better than Forrest Bird? 🍷

—Cama McNamara



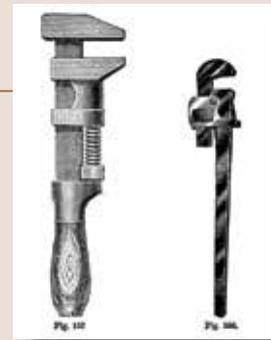
September 13, 1870

U.S. Patent No. 107,304 was granted to **Daniel C. Stillson** for an improvement in wrenches (far right). This modern, adjustable pipe wrench is also known as the Stillson, or monkey wrench.



September 4, 1888

George Eastman, an avid photographer and founder of the Eastman Kodak Company, was granted U.S. Patent No. 388,850 for the Kodak roll film camera. Together with a full-time research scientist, Eastman perfected roll film, which made possible Thomas Edison’s motion picture camera in 1891.



September 19, 1876

Melville Bissell was granted U.S. Patent No. 182,346 for a carpet sweeper. Following Bissell’s death in 1889, his wife, Anna, took control of the company, becoming America’s first female CEO.

September 20, 1938

U.S. Patent No. 2,130,948 was granted to **Wallace Carothers** for the synthetic fiber nylon. Although his discovery became one of the great inventions of the 20th century, Carothers never saw success. In 1937, he drank a deadly cocktail of lemon juice laced with potassium cyanide, adding his name to the list of famous chemists who had committed suicide.

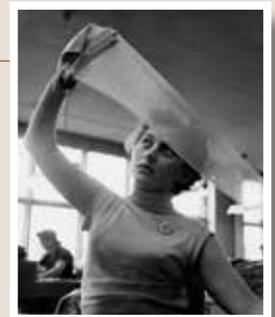
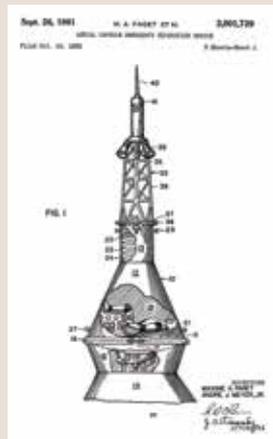


PHOTO BY ERIK LILJEROTH



September 26, 1961

Maxime Faget, the chief designer of America’s manned space program during the race to the moon, etal. were granted U.S. Patent No. 3,001,739 for a space capsule emergency separation device. Faget was also granted U.S. Patent No. 3,093,346 for a space capsule used on the first American manned spacecraft, Project Mercury. The escape tower concept was used on the Mercury, Apollo and Soyuz spacecrafts.

Standing on the Shoulders of GIANTS

Look to the Past for Future Success

BY JACK LANDER



Nikola Tesla developed much of the hardware needed for power distribution.

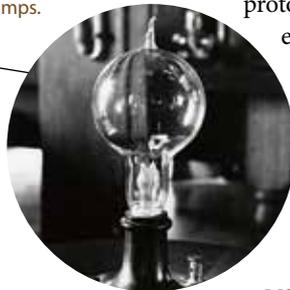


Thomas Edison and Charles P. Steinmetz in the library of the Briarcliff Lodge during a meeting of the Edison Lighting Company.



Sir Humphrey Davy demonstrated an incandescent lamp using a platinum ribbon in 1802. There were 22 inventors of incandescent lamps that preceded Thomas Edison's.

One of Thomas Edison's early first successful incandescent lamps.



“If I have seen further it is by standing on ye shoulders of Giants.” So wrote Isaac Newton, the English mathematician, physicist, inventor and astronomer, as he graciously acknowledged that his ideas for the laws of gravity were based on the works of Copernicus, Galileo, Kepler and others less renowned. Newton also recognized the contributions of the mathematicians Descartes, Fermat, Pascal and Barrow for his creation of modern calculus. It has always been, and will continue to be, that we inventors build on research, findings and the successes of our predecessors.

Inventors are usually improvers, not discoverers, of grand new laws of physics. Although we may be tempted to credit our inventions entirely as our own work, the reality is that behind us lies a trail littered with trials, failures and successes, each from a human being who dreamed, thought, sketched, wrote and made prototypes. For every name recorded in the United States Patent and Trademark Office, there are many unknown tinkers, experimenters and sketchers—heroes only to family and friends—but essential to the progress of civilization.

Between 1800 and 1945, 36 inventors contributed important components to the invention of the modern radio. No single person invented it. Not Heinrich Hertz, Guglielmo Marconi, Nikola Tesla or Lee de Forest, who, in 1907, proclaimed himself the “father of radio” as we know it today. How many of us have even heard of Reginald Fessenden, the Canadian who invented amplitude modulation? Fessenden's AM is the technology that enabled the giant leap from radio as a means of telegraphy for ships at sea, to voice and music. AM prepared radio for its modern proliferation.

Although we may be tempted to credit our inventions entirely as our own work, the reality is that behind us lies a trail littered with trials, failures and successes, each from a human being who dreamed, thought, sketched, wrote and made prototypes.

Lighting the Way

We have no exact way of knowing how much Edison knew of the 22 inventors of incandescent lamps that preceded him, but he almost certainly knew of the experiment of England's Sir Humphrey Davy, who demonstrated an incandescent lamp using a platinum ribbon in 1802. Davy set into motion the train of inventions that followed, until Edison patented his lamp 77 years later and launched the first practical system of electric lighting. Edison most likely knew of the patents issued to English inventor Frederick de Moleyns in 1841 and the American inventor John Wellington Starr in 1845, and began his experiments based on what these men and others had already demonstrated. The use of carbon, platinum and tungsten as materials for filaments were known and tried before Edison developed his carbonized bamboo filament, patented in 1880 (No. 533,244).

Edison's early lamps lasted only a few hundred hours, and his direct current generators had to be located every mile or two in order to avoid excessive loss of power, but he started the system, and he and others quickly made improvements. Tesla and Charles Proteus Steinmetz made practical the distribution of electricity over long distances through their many alternating current inventions, although not without a battle between Tesla and Edison, who stubbornly clung to his impractical DC power distribution.

Edison's early claims to fame were his improved filament manufacturing process, use of greater vacuum and higher filament electrical resistance, which enabled the use of higher voltage and smaller wires for carrying electricity over practical distances to households and businesses. But it was Edison's entrepreneurial drive to launch and expand his system of lamps, power generation and power distribution, primitive as it was, that made him the acknowledged "inventor" of the light bulb, at least in the United States.

It Takes Two

Although Edison deserves full credit for his trials and persistence for his early inventions and developments, it was Charles Proteus Steinmetz who was the genius behind Edison in the theoretical work that was essential to the mass distribution of alternating current. Edison understood his limitations in the theoretical realm

and depended on Steinmetz to fill this gap. The two appear in several photos together, and earlier this year, a bronze statue of the two men was erected in Schenectady, N.Y., where so much of the work on distribution was accomplished. The two are standing, Edison towering over the very short Steinmetz, who suffered severe curvature of the spine. Their teamwork reminds us that it is not only the shoulders of giants of the past that we stand on.

Tesla, Steinmetz's counterpart at Westinghouse, developed much of the hardware needed for power distribution: the alternating current generators, transformers and motors that quickly became the

workhorses for factories. Although the theories, inventions and the 100 year "war of the currents" that was waged between Tesla/Westinghouse and Steinmetz/General Electric have blurred with the passage of time, inventors of today stand on the shoulders of inventors such as Tesla, Steinmetz and Edison, as well as the hundreds of contributors who preceded us.

My objective here is not to promote humility but to emphasize that we can become better inventors if we look more deeply into the background of our ideas. A patent search of inventions similar to ours is a good place to start. Find out what has already been done that was sufficiently novel to justify a patent. In reading such patents, we may come upon invention history that provides clues to what we can successfully improve.

In working with hundreds of inventors over the past 20 years, I have found that the single biggest mistake is the failure to search through prior work. There is no need to reinvent the wheel. In a sense, finding fatal prior art is a good sign—a sign that we have recognized and defined a problem, need or want that was real, not imaginary. It validates us as inventors. But we must persist and "see further," as Newton said. We must be willing to build on and acknowledge the work of others, even knowing that most of our great ideas are already revealed in past works. 📖

Jack Lander, a near legend in the inventing community, has been writing for *Inventors Digest* for 19 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.



Battle of the Bulge

MealEnders® Offers an Innovative Solution for Overeating

BY EDITH G. TOLCHIN



Mark Bernstein, a lawyer by profession, developed MealEnders to help him lose weight.

As a lifelong contender with the battle of the bulge, I am always interested in products that might help middle-age spread. After noticing an ad for MealEnders® on my Facebook page, I tracked down the inventor, Mark Bernstein. He explained the concept behind MealEnders, which utilizes a combination of taste sensations to instill feelings of satiation, which, in turn, can lead to weight loss. Bernstein's foray into nutrition, psychology and product development has taken him far outside the arena of his former legal career.

A native of Knoxville, Tenn., Bernstein graduated from the Wharton School of the University of Pennsylvania. After working as a political assistant in the House of Commons in London, followed by pruning apple trees in Israel, he landed at New York University School of Law. Upon graduation in 1986, Bernstein moved to Atlanta, serving first as an attorney with King & Spalding and then as a senior legal counsel at Turner Broadcasting System, Inc.

At Turner, Bernstein was part of the team that birthed CNN's new media businesses. He ultimately served as a senior vice president at CNN and as general manager of CNN Interactive. In 1999, Bernstein was recruited by Springstreet.com, a division of

Move.com, the Internet's dominant real estate portal, as president.

With an interest in education and literature, several years later, Bernstein co-founded Hundreds of Heads Books and West Hills Press, where he serves as co-publisher. The two imprints publish titles ranging from *How to Survive Your Freshman Year* to the thriller *Eyes of Abel*.

In addition to his business ventures, Bernstein has been an active community volunteer for more than 25 years. He has contributed his expertise to such organizations as Hands on Atlanta and the Hands on Network, as well as the national boards of B'nai B'rith Youth Organization and the American Jewish World Service. In 1999, he was named by the World Economic Forum as one of its 100 Global Leaders for Tomorrow. In 2004, Bernstein was selected as a member of the Wexner Heritage Program, a Jewish leadership development organization for volunteers in North America.

Not one to sit still, Bernstein moved in another direction when he became concerned about his health and could not find a simple solution to his overeating problem. MealEnders was the result of the merger of Bernstein's investigative curiosity with his business prowess.

Edith G. Tolchin: When did you have that “light bulb” flash to create MealEnders?

Mark Bernstein: As I grew older and started to battle with my belt line, I discovered two obstacles to managing my weight: the willpower to end meals before I felt full and the ability to avoid unnecessary snacks. Too often, I ate a big plate of spaghetti, but still felt hungry. I often ate seconds and thirds.

After my doctor suggested I would benefit from losing a few pounds, my need to break these unhealthy habits became imperative. But, I felt helpless. I wanted to change, but I couldn't do it alone. I needed a little boost of outside willpower.

I searched the market for a formulation of flavors or sensations that would help me turn off the unhealthy urges to keep eating when I couldn't stop. I talked to biologists, dentists, nutritionists and culinary experts looking for a magic bullet. They all agreed that nothing like that existed.

I found most of the research concerning weight loss and weight management to be focused on either filling people up with unpleasant fibers and liquids before eating; limiting what we eat with the use of unsavory, prepackaged foods; or adding chemicals or food additives so we would enjoy them less.

During my own research, I learned that my overeating challenge was not just a problem of willpower, it was a problem of biology. It takes the brain 20 minutes after eating to receive the hormonal signal from our digestive track that we are, in fact, satiated. This is why I felt hungry after having a big plate of spaghetti. I wasn't giving my brain enough time to catch up with my stomach.

EGT: How long did it take your company, WillPower Labs, Inc., to develop the product?

MB: It took almost two years to research, develop and test a prototype; find appropriate manufacturers; develop messaging, marketing support and a website; and launch the product.

Once I engaged Mattson, the nation's leading food development firm in Silicon Valley, to help me create MealEnders, it took nearly a year to come up with a winning prototype and product. We began the search by interviewing leading doctors, dentists, psychiatrists, psychologists, nutritionists and weight-loss professionals.

After months of research with a variety of compounds, flavors and form factors, we arrived at the duo-sensory approach of today's MealEnders. Our proprietary flavor/sensation combination provided the right cues and sensory experience to do the job.

After a national test in which a majority of users reported that MealEnders had helped them stop eating and lose weight, we decided to commercialize our signaling lozenges and share the invention.

EGT: When did you launch MealEnders?

MB: We launched publicly in October 2014 at the Food and Nutrition Conference and Expo in Atlanta. We began promoting our product online January 2015.

EGT: How does the product work?

MB: MealEnders are drug- and stimulant-free “signaling lozenges” designed to help people avoid overeating and master portion control by removing from the mouth and mind the desire to eat





Developing a product in the lab is significantly different than developing one in a commercial factory. It took significantly more time to make that jump than I expected. As a small company, you have very little leverage, and thus every hiccup encountered is much harder to solve.

more than necessary. Unlike extreme diets, meal replacements, appetite suppressants or supplements that focus solely on the stomach, MealEnders works with the body's natural hunger and fullness-signaling process. They are a safe and sustainable way to curb the appetite. They contain no drugs, added stimulants, herbs or toxic ingredients. MealEnders work on a behavioral, sensory and psychological level to empower smarter eating.

The product consists of two components: a sweet, outer reward layer, or "dessert," and a cooling/tingling inner core that engages the trigeminal nerve, which senses tastes. This cues the end of eating and clears the palate. By keeping the mouth and mind occupied for up to 20 minutes—the overeating period—MealEnders give the body's natural satiety process time to catch up. MealEnders come in 25-piece pouches in four flavors: chocolate mint, cinnamon, mocha and citrus.

MealEnders' behavioral psychology approach is what sets it apart from other weight-management products. MealEnders catalyze behavioral change by retraining the mind to stop eating with the eyes. They heighten mindfulness of natural digestive rhythms; create habitual cueing of meal completion; train the mind to recognize healthy portion sizes; and empower a sense of

Bernstein unveiled MealEnders at the 2014 Food and Nutrition Conference and Expo in Atlanta.

control. By engaging the consumer, both mentally and physically, the signaling lozenges heighten awareness of natural satiety signals, helping regulate portion size and master the healthy habit of mindful eating.

EGT: What, if any obstacles, did you find along the way of product development?

MB: We initially set out to find an interrupter but ultimately realized we needed a tool that would also be tasty—something that would help the transition from eating to not eating. Also, developing a product in the lab is significantly different than developing one in a commercial factory. It took significantly more time to make that jump than I expected. As a small company, you have very little leverage, and thus every hiccup encountered is much harder to solve.

EGT: Where is the product made?

MB: It is made in two factories in Chicago.

EGT: Did your product require FDA approval?

MB: MealEnders contain no drugs, stimulants, herbs or toxic ingredients. It is regulated as a food; therefore there was no preapproval required.

EGT: Where are you selling MealEnders other than on Amazon and your website?

MB: We currently have relationships with BuluBox.com and Joyus.com. We also met international distributors in Lebanon and the Philippines at the Food and Nutrition Conference and Expo who want to introduce MealEnders to their countries.

EGT: Do you have any words of wisdom to share with *Inventors Digest* readers regarding developing an invention or new product?

MB: Often, the process of inventing is easier than commercialization and execution of the business. It can be very stressful and lonely, without good partners, to be a small business—especially if it's under-capitalized. Without the leverage of a big business, you have to be prepared to roll with the punches and keep getting off the mat, because as the little guy, there are lots of things you can't control. Lots of things will go wrong. Prepare for those things as much as possible. 📞

For information, visit www.mealenders.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.



Circle Around

Jeff Dahl Finds Life Is Better in the Loop **BY JEREMY LOSAW**



There is a silver lining to every cloud should be Jeff Dahl's mantra. During the Great Recession of 2008-'09, Dahl, like many others, lost his home. Although it was a time of great adversity for him and countless Americans, those tumultuous years also fueled innovation and entrepreneurial enterprises.

As he struggled with the tangle of ropes and bungee cords he used to secure his furniture during his move, Dahl came up with the idea for his invention, LoopRope®. The product and its companion, BuoyRope, led to his economic recovery—and a profitable business.

"I had never been good at tying knots," Dahl says. "The thought occurred to me of how cool it would be to manufacture a rope that had loops that would come out of the weave infinitely, every couple of inches, and you could zip tie the loops together to create tension." Once the idea was planted, Dahl wasted no time in producing his first prototype, which he used to finish his move that day.

The result is a versatile bungee cord system that can be used to lock down gear, dock small boats and jet skis, tether

LoopRope's strength and versatility make it ideal for securing skis or kayaks.

surfboards, secure fishing rods and even walk the dog. Simply put, LoopRope is a fully adjustable bungee cord with multiple tie-down lengths and attachment points. The explanation is more complicated. LoopRope uses a continuous loop of bungee cord that is crimped every few inches along its length to make loops. Gear can be anchored in the loops, which also allow the cord to stretch over a load easier than with a traditional bungee cord. The loops also segment the cord so that it can be used as a variable-length bungee by engaging only a few of the loops. S-biners can be clipped to an anchor point or each other to provide versatility in the load-holding arrangement.

LoopRope Comes Around

After Dahl completed his move, LoopRope developed quickly. A week after the first prototype was designed, he took it to a patent attorney in Medford, Ore., where Dahl lived, to conduct a patent search and begin the filing process.

In the meantime, Dahl continued to refine the product. He tested different types and sizes of rope, as well as various rope attachments, eventually settling on bungee cord, as the elasticity proved important in keeping loads down. The loops were made by heat shrinking the two sides of the cord together every couple of inches and sewing them together. Dahl made about 50 different prototypes in the 30 days that it took his attorney to file the patent documents.

Legalities squared away, Dahl switched his focus to letting people know about his invention. He had samples made and started patrolling the parking lots of home improvement stores to find people who might be interested. Once Dahl began selling them for \$20 each, he knew he had a viable product.



S-biners can be clipped to an anchor point or each other to provide options for carrying loads.

Loopholes

Despite the positive feedback he was receiving, Dahl was still dealing with technical issues. A friend who was using a LoopRope showed Dahl how the stitching over the heat shrink was ripping apart. During the sewing process, the needle was destroying the rubber strands that composed the cord, creating weak points.

After patrolling the aisles of Home Depot, Dahl found a solution in the plumbing aisle: a copper coupling. He crimped the bungees together with the couplings. Although it was an expensive option, it worked—but it was a trip to the local bar that really set Dahl on the right track.

“I always carry the rope with me,” says Dahl. “A guy asked me what it was, and I gave him a demo by strapping it to his barstool.” After further conversation, the man gave him the contact for a local machinist, who made a custom arbor press to crimp the bungee cord together. The copper couplings were replaced by aluminum, which cost one-sixth less.

Jeff Dahl's TIPS FOR BUSINESS SUCCESS

What are the secrets to Jeff Dahl's success? In addition to having a viable product, Dahl recommends that inventors “be creative, focused, very persistent—and patient. There is no silver bullet for getting your product on a shelf.” There is a process, however, to beating the odds.

Dreaming the big dream is easy. Acting on it—and then waiting out the inevitable ups and downs—is another matter entirely. The following are some of Dahl's pointers for overcoming the oftentimes rocky road to business achievement.

Don't Wait

If you have an idea for a small business, get started. “The day I thought of LoopRope, I also named it and built my first prototype,” says Dahl. Within 30 days he had made several prototypes and filed for a patent.

Rather than finding investors or financing, Dahl used credit cards and income from rental property to finance his venture.

Find an Advocate

Dahl's first challenge was finding people who believed in his product. “I could not get a good friend who had been successful in the drive-thru coffee business to test a rope,” he says.

Dahl decided to keep a couple of LoopRopes in his car in case his friend changed his mind. He had an opportunity to demonstrate LoopRope two weeks later. Rather than getting the feedback Dahl expected, his friend became Dahl's first investor.

Be Willing to Make Changes

Dahl's original plan was to scale up quickly, which turned out to be the wrong move. “When I first started out, we poured a

“I had never been good at tying knots. The thought occurred to me of how cool it would be to manufacture a rope that had loops that would come out of the weave infinitely, every couple of inches, and you could zip tie the loops together to create tension.” — JEFF DAHL

Overcoming Hurdles

The next hurdle was finding a manufacturer. Dahl was making LoopRopes in his garage in his spare time, and there was no way he could keep up with the demand. When a local coffee shop owner got wind of the idea and wanted to partner, Dahl agreed. The seed capital allowed him the opportunity to hire consultants to design the packaging and branding, and freed his time to attend tradeshows to sell the product. It also allowed him to move the manufacturing out of his garage.

Dahl set up a warehouse and hired workers to keep the production in the United States. The operation proved too inefficient, however, and he began looking for a manufacturer overseas. Dahl placed an order through a broker he met at a tradeshow, with disappointing results. The LoopRopes were made with subpar bungee and many of the clamshells were crushed during shipping. Despite the setback, a sourcing group in California found a factory that could produce a higher quality product.

Getting the product to market had its ups and downs. Dahl sold 11,000 units to WalMart for the 2010 holiday season, but the buyer retired shortly after the order was placed, and Dahl was unable to confirm another. He was also invited to make his pitch on *Shark Tank*, but declined because of the terms.

Dahl has made steady progress since. A relentless social media campaign landed the product on the shelves of Cabela's, followed by Duluth Trading, Camping World, Amazon and Canadian Tire. Recently, Walmart placed another order.

Surprisingly, Dahl has been successful with home shopping networks. LoopRope was voted “Most Wished For” in the 2014

QVC Sprouts® competition, a joint venture between QVC and the United Inventors Association. The win allowed him the opportunity to sell LoopRope on the popular channel. During the show, which aired this past May, the product doubled the revenue-per-minute expectations. With that success, Dahl will return to QVC the first quarter of 2016.

LoopRope LLC recently received an important endorsement from the Defense Logistics Agency, which will allow Dahl to sell his products to the U.S. Armed Forces. The military version of LoopRope is made in the United States under the Ability-One Program, the largest single provider of employees who are blind or have significant handicaps.

Dahl says he has sold approximately 200,000 of his “Loop-Technology” products, as he refers to the LoopRope and Buoy-Rope, which is geared toward the marine industry. In addition to the United States and Canada, the product is sold in Japan, Germany and Australia, as well as others around the globe. Although current sales are around \$310,000 annually, Dahl hopes to make LoopRope as well known as the product he likes to compare it to: duct tape. 🐼

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



ton of cash into marketing. I also had a bunch of employees trying to manufacture here in Medford,” Dahl says.

Revenue doubled from \$305,000 to \$706,000 in three years, but profits were tougher to come by. Local manufacturing proved to be cost prohibitive, amplifying the pain caused by failed investments in trade shows, and television and radio advertising. So, two years ago, Dahl reversed course and began to reduce LoopRope's footprint.

Today, Dahl leverages Chinese imports with homegrown PR and social media to reduce costs. “Our annual sales initially dropped to roughly \$175,000, but are coming back stronger without the overhead,” Dahl says.

Maintain Relationships

Dahl worked hard to maintain key relationships during the company's transition. When he tried to sell LoopRope to the United States military, he received help from LC Industries,

a company based in Durham, N.C., that employs blind and handicapped workers and has experience working with the federal government. In May 2014, the partnership bore fruit when the Defense Logistics Agency endorsed LoopRope, which was then added to the Federal Procurement List.

Be Persistent

Dahl didn't have the same contacts in the retail channel, so he opted for a more traditional strategy. He knocked on as many doors as he could via social media channels.

The company's relationship with Cabela's is the result of Dahl regularly reposting a video of LoopRope in action on the company's Facebook page. “After a while I got copied on an email to the Cabela's buyer for the ATV/quad category asking if she would take a closer look at LoopRope. A couple of weeks later we were filling out vendor forms,” Dahl says.

Source: www.LoopRope.com



POWERFUL PODCASTS

Informative Entertainment for Inventors and Entrepreneurs

BY JEREMY LOSAW



In a former job, I spent most of my day sitting at a computer designing with SolidWorks. My office was in a cube farm, and the atmosphere was chilling, to put it lightly. Every minute dragged on. To alleviate the boredom, I began listening to music with headphones. The tunes helped pass the time, but eventually, I grew tired of listening to the same songs over and over again.

Just when I was at my wit's end, podcasting tiptoed into the mainstream. I was a big fan of the movie *Clerks* and was excited to discover that the director, Kevin Smith, had a podcast called *Smodcast*. I downloaded every episode and designed parts with SolidWorks while Smith had heart-to-heart conversations with my favorite *Clerks* characters. Eventually, I found several more podcasts, including some from NPR and BBC, as well as the comedies *The Adam Corolla Show* and Greg Proops' *The Smartest Man in the World* Proopcast, that I really enjoyed. I became the hosts' anonymous friend, while they talked me through the day.

Seven years later, the format is bigger than ever, and I am a podcast fiend. Shows like *This American Life* and *Serial* have become standard entertainment for commuters and fitness fanatics, with millions of downloads per episode. Beyond these mainstream successes are podcasts that cover a variety of genres and interests, including many aimed at inventors and entrepreneurs. Following are my four favorite podcasts for inventors, prototype and product developers, and startup enterprises.

StartUp

gimletmedia.com/show/startup

What could be a more accurate name than *StartUp*? Great storytelling gives this podcast mass appeal, but the show is a must for both seasoned and newbie inventors. *StartUp* is hosted by Alex Blumberg, former producer of *This American Life* and founder of NPR's podcast *Planet Money*. In a style reminiscent of *This American Life*, Blumberg chronicles his journey in the founding of his podcast company, Gimlet Media. The often-embarrassing tale includes how Blumberg approached inventors for funding, refined his pitch, found a partner, and decided on a name for his company.

The highlights of the show are the interludes in which Blumberg discusses his business venture with his wife, Nazanin. Their unfiltered moments reveal insight into the numerous ways launching a company affects families and relationships. The couple recently wrapped the show's second season, which followed the story of the online matchmaking agency Dating Ring. Look for the third season this fall.

Art of the Kickstart

artofthekickstart.com



If you're interested in crowdfunding, but don't know where to begin the process, *Art of the Kickstart*, hosted by Matt Ward, is the podcast for you. Ward interviews inventors and entrepreneurs who are using crowdsourcing to get their products into production, and he encourages these brave souls to share the keys to their success. Some of his guests are big-hitting authors and entrepreneurs, including Seth Godin. Many are first-time, "garage-dwelling" inventors and aspiring entrepreneurs.

Ward has an engaging style, and his guests eagerly discuss pertinent details about the twisty path from that first lightning-bolt moment to arriving at a manufactured product. During the interview process, guests reveal significant tips to aid in the journey. With 110 episodes and counting, Ward has the capacity to keep you informed and inspired for months.

Inventors Mind

inventorsmind.com



Chris Hawker, inventor of the Power Squid* and president of the product development firm Trident Design, hosts the podcast *Inventor's Mind*. Over the course of the 20 years that Hawker has been in product development, he has taken more than 70 products to market. His insights are relevant for inventors of every level.

The episodes cover a gamut of issues: crowdfunding, product licensing, tradeshows and corporate meetings. In addition to offering excellent advice, Hawker also interviews other product-development professionals. Many of the episodes last less than 10 minutes, but they are packed with information that will help you get your ideas out of your mind and into the marketplace.

**Similar to a power strip, the Power Squid is a flexible way to convert one grounded wall outlet into five grounded adapter-compatible outlets.*

WTFFF?!

hazzdesign.com/3d-printing-podcast

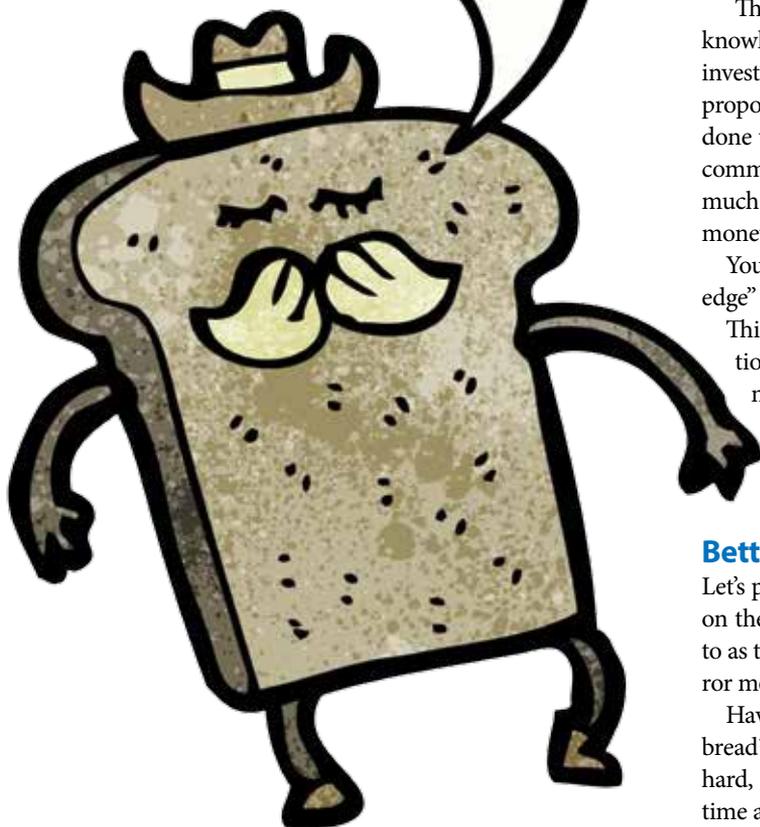
Not to be confused with comedian Marc Maron's entertainment interview podcast, WTF, *WTFFF?!* is a podcast about 3D printing. FFF stands for "fused filament fabrication." Hosts Tracy and Tom Hazzard are co-owners of Hazz Design Consulting, which has been in the business of consumer product design for more than 20 years. The Hazzards are pros at using 3D printing in the design process, but there was a time when the technology was new and challenging for them, which led to the podcast.

WTFFF?! is geared toward small business owners or home 3D printer users. The couple's podcast covers a plethora of topics, from printing issues, such as repairing clogged extruder heads, to where to find good 3D models, and advice on finding jobs in the 3D field. The episodes, which are generally less than 10 minutes, teach the basics of the printing process and provide essential information on getting the most from a 3D printer. ☺

No Matter How You Slice It,

There's No Substitute for Hard Work

BY JOHN G. RAU



This equation defines money as inversely proportionate to knowledge or, within the inventing context, the amount of money invested in the development of a new invention idea is inversely proportionate to how smart you are. In other words, if you haven't done your homework and conducted research into the potential commercial success of your new idea (that is, if you don't have much knowledge), then you'll work harder and continue to spend money with a limited chance of achieving success.

You can rewrite the original equation by substituting "knowledge" for "power" to obtain: $\text{Knowledge} = \text{Work} \div \text{Time}$.

This suggests that the less time you spend on your new invention idea, the smarter you are, which would be the case if your new idea had but a slim chance of commercial success.

The question I'm leading up to is: Why spend the time, energy and money to develop a new invention idea without first determining that there is a market for it?

Better Than Sliced Bread

Let's put this discussion in the context of a classic example based on the fascinating experience of Otto Rohwedder, often referred to as the "Unconquerable Slicer." No, he was not the star of a horror movie.

Have you heard the expression "greatest invention since sliced bread?" Rohwedder actually invented sliced bread. He worked hard, got smart, performed market research, continued to invest time and money in his invention idea, refused to quit, and defied all odds in getting his invention to market.

Well into the early 1900s in the United States, bread was sold in loaves to preserve freshness. Housewives complained that slicing bread was burdensome, time-consuming and sometimes perilous, as hardened, stale loaves required very sharp knives. In typical inventor fashion, Rohwedder observed this problem and specifically set out to develop a machine for bakers to pre-slice bread.

How Thick Is a Slice?

To gain further insight into the demand, Rohwedder conducted one of the earliest examples of market research for an invention. He devised a brief questionnaire for the purpose of determining the thickness of a slice of bread that would have universal acceptance, and then placed an ad in several large newspapers. Over the next few months, he received responses from approximately 30,000 housewives—an impressive result, even by today's standards.

Successful inventors know that inventing is difficult work. If you're not willing to work hard, you don't stand a chance for success. As brilliant as Thomas Edison was, he admitted "there is no substitute for hard work." However, before investing time and money in your new idea, you need to ascertain if there is a market for your product.

A number of years ago, I found in an engineering periodical a unique method for mathematically characterizing and describing the work and invention interaction process within the parameters of work performed and time spent.

The definition of power is work per unit of time, which can be expressed mathematically as follows: $\text{Power} = \text{Work} \div \text{Time}$

If you substitute "knowledge" for "power" and "money" for "time" in the phrases "knowledge is power" and "time is money," the result is: $\text{Knowledge} = \text{Work} \div \text{Money}$.

The following equation demonstrates a different relationship: $\text{Money} = \text{Work} \div \text{Knowledge}$.

Based on the results of his market research, Rohwedder embarked on a long and painful journey to bring his invention to life. In 1917, he built his first prototype. Unfortunately, it, as well as his drawings and blueprints, were subsequently lost in a fire.

Rohwedder, however, was determined to see his idea through. He took a job as an investment and securities analyst and saved his money. By 1927, he had built another prototype bread-slicing machine—a massive device, five feet wide by three feet high. A year later, he filed U.S. Patent No. 1867377 for a “single step bread-slicing machine,” which was described in the 1928 issue of *Modern Mechanics* as follows:

“Two banks of thin sharp steel blades are utilized. The cutting edges are all in the same plane and alternated so that while one blade moves upward its immediate neighbor moves downward. As the blades pass through the soft bread, the loaf closes immediately behind the blades and keeps the air out. These perfect surfaces fit snugly against other and adhere surprisingly, thus retaining the freshness of loaf.”

Commercial Success

On July 7, 1928, the first loaf of commercially sliced bread was sold by the Chillicothe Baking Company in Chillicothe, Mo. Two years

later, the New York-based Continental Baking Company used Rohwedder’s machines to build an entire business around sliced bread. Wonder Bread can be found on grocery shelves today.

The most fascinating piece of Rohwedder’s story is when he bounced back after his original prototype and its documentation literally went up in smoke. Gen. George Patton said, “Success is how high you bounce when you hit bottom,” which accurately portrays Rohwedder’s actions.

Rohwedder’s experience demonstrates that the process between conceiving an idea and the time it is placed on a store shelf can be long and challenging. Knowledgeable inventors advise those struggling with their ideas to have patience and follow due diligence in the commercialization journey. As a result, years of hard work will eventually pay off. As Edison advised, “If we want to achieve success and our goals, hard work will need to take place.” 🍞

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 ultraresch@cs.com.



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The Perfect FIT

INNOVATIVE TECHNOLOGY MAKES HIGH HEELS COMFY

BY CAMA MCNAMARA

Imelda Marcos might have been the queen of shoes, with a closet lined with more than 3,000 pairs of the finest designer labels money could buy, but Julie Lopez reins supreme in her quest to make heels not only fashionable, but comfortable as well. “A great pair of high heels makes a woman feel beautiful,” says Lopez. That feeling, unfortunately, is often associated with another one: pain. Finding a comfortable pair of four-inch heels is like discovering your foot slides into the glass slipper.

A self-proclaimed “high heel girl,” Lopez discovered that as she grew older it became more difficult to find a pair of heels she could wear for any length of time. But that didn’t prevent her from trying. “You don’t care what you feel like as long as you look good,” she proclaims.

I Feel Your Pain

Lopez’s high-heel mantra faded during one of the most important events in her life: her daughter Lauren’s wedding. Lopez’s feet ached so badly that she

was forced to greet reception guests barefoot. After the wedding, Lopez still refused to put on a flat shoe. “I wasn’t ready to stop wearing heels,” Lopez says, “so I needed to find a way to make them comfortable.”

A former orthopedic nurse, Lopez understands the causes of foot pain. Many of her patients had worn ill-fitting shoes, particularly high heels, which affect the foot in two potentially problematic ways: They put pressure on the ball of the foot, which causes the bones to splay, which in turn, increases compression on the sides of the foot. Lopez’s main problem was bunions.

Through experience, Lopez knew there was nothing on the market to soothe her aching soles, so she began searching the Internet. She was led to Wenco International Footwear Consultants Inc. in Canada, where she met Phillip Nutt, a veteran shoe-industry designer, legal expert and consultant. He was able to translate Lopez’s vision into reality. With Nutt’s experience and expertise, the two developed Lopez’s patent-pending Flex Innovation Technology, or FIT.



Julie Lopez waits anxiously to open the boxes from Italy and examine the contents.

PUT YOUR BEST FOOT FORWARD

Business Tips from Julie Lopez

- You need to be thick-skinned and broad-shouldered. Be ready to persevere.
- Trust your gut. The times I didn't are when I got bitten.
- Be realistic in your expectations.
- Check your ego and make sure your idea is going to work.
- It takes more money than you think. Be prepared.



Comfort Zone

Lopez wanted to create a shoe that was flexible enough to accommodate a bunion. She knew that the box of the shoe needed to be broad enough to accommodate the toes spread in their normal anatomical position, and she did not want the top part of the shoe to impact the metatarsals, the bony part of the foot.

Nutt designed the shoe according to Lopez's specifications, developing FIT as the two progressed. While most comfort elements in shoes work from the bottom (rubber soles and squishy bottoms), Lopez's innovative technology works from the top. FIT includes three basic components that have to work together for the shoe to perform correctly: a wide toe box to accommodate problems such as bunions or arthritis; tiny slits cut through the leather on the front sides of the shoe for added flexibility; and designing the upper construction of the shoe so it doesn't impinge upon the bony part of the foot. A layer of Lycra is sandwiched between the leather and lining, and a pad offers increased comfort in the area where the ball of the foot rests.

With Nutt's knowledge of shoe construction technology, Lopez was able to file for a patent. Her attorney is in the process of defending the claims.

Fancy Footwork

Lopez knew that FIT would work best in combination with fine Italian leather. She took her idea to Michael Brasini, an Italian-born product developer and shoe designer based in New York. "He was the first person who immediately understood the importance of the upper-foot technology," says Lopez. Brasini also thought that FIT was worthy of Italian craftsmanship, and the two began collaborating on

designs. Lopez showed Brasini styles she liked, and he let her know the possibilities. By 2012, the new owner of Julie Lopez Shoes was ready to take her first steps into the business world.

The fashion industry evolves in a whirlwind of rapidly changing styles and colors. To stay *au courant*, the two analyze fashion trends at runway shows and peruse magazines and boutiques. "I have a

strong hand in everything we do," says Lopez, "yet I have to trust his knowledge of shoemaking and design."

Brasini sketches styles, which evolve into prototypes at the Tuscan manufacturer. These are shipped back and forth from Italy to Lopez's warehouse in Concord, N.C., several times, with adjustments made at each location before going into production. Lopez makes certain the size 7 prototypes she receives are tested for comfort and are aesthetically pleasing before placing an order.

Each shoe is composed of four or five parts, or lasts, the plastic molds that provide the basics of the shoe design. The final leather versions are handmade with the use of a machine. Lopez chooses the leather for each style and has the shoe produced in a variety of colors. This month she will attend Lineapelle, an international exhibition of leather in Milan, which she also does each February, to scope out upcoming trends.

The turnaround time from the initial design to a finished product is six to eight months, an eternity for a small business owner. Lopez waits anxiously to open the boxes from Italy and examine the contents.

Despite the emphasis on comfort, Lopez wants her shoes to also be fashionable, which, in the shoe world, is often an oxymoron. Most comfortable shoes are simply not fashionable. For that reason, Lopez refers to the shoe line as "fashionable shoes with comfortable features."

Shoe Sales

Lopez's original idea for marketing the line was through retail outlets, but the markup was going to make them too expensive. "I want the shoes to be accessible to as many women as possible," she says, noting that



her website has been a valuable vehicle for reaching women across the country.

While her online business is growing daily, shoes are a tough sell on the Internet, as most women want to try on shoes before purchasing them. To offset this potential deterrent, Lopez offers free shipping and exchanges. She hopes that when enough women are happy with their purchases, word will spread. “I really want women to try on a pair of shoes and say, ‘I didn’t have to take them off.’”

The shoes are true to size in terms of length, but wider in the toe box, and many women have never experienced this type of shoe fit. Mistakes in ordering, says Lopez, are made when women, who for years wore shoes a size larger than their foot to accommodate foot problems, order a size larger than they need.

Lopez admits that while she loves her shoes, with their intoxicating textures and colors, one of her biggest challenges is running a business—and getting brand recognition with Internet-only sales. “I love the product; choosing leather,” Lopez says. “Running a business is not my favorite activity. It’s hard to persevere through starting something new. Success doesn’t come easily. It’s a daunting task to run a business and promote it at the same time.”

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— JULIE LOPEZ

Lopez hired a public relations company to generate interest in her products and a social media company to conduct a sophisticated campaign. This past January, to Lopez’s delight, Julie Lopez Shoes made Oprah’s O List, a process that required shipping approximately 30 pairs of shoes back and forth to the editorial staff at *O The Oprah Magazine*. Lopez hopes her shoes will be considered for another O feature.

Even though Lopez and Brasini work diligently to fashion a variety of styles and colors to accommodate different wardrobes and tastes, Lopez finds that basics sell best. She ultimately sells “more blacks and neutrals, which is what women need,” she says. Pumps are available with three- and four-inch heels, but peep toes, wedges and booties are also offered. Prices of \$198 to \$250 reflect the Italian craftsmanship.

Lopez’s immediate goal is to increase sales, but ultimately she hopes to find a factory in the United States that can maintain the quality of her shoes at a reduced cost. In the meantime, Lopez wakes up each morning eager to get to the office. She keeps a plaque on her desk that reads “Cinderella—proof that a new pair of shoes can change your life.”





Forget the

Bows

Bring On SnapLaces® BY JEREMY LOSAW

“It’s not just a shoelace. We’ve gotten enormous support from amputees, those with cerebral palsy and autism, and others with limited mobility...who could not tie their shoes before. Now they have one less thing they need someone to do for them.” — REGGIE SENEGAL



Competitive athlete and inventor Reggie Senegal improved his triathlon time using SnapLaces during the transition between his bike ride and run.



One of a child’s most thrilling accomplishments is learning to tie his own shoes—a simple rite of passage people have been completing for thousands of years. But what if you couldn’t tie your shoes? How would you feel? Thousands of children—and adults—in this situation are taking advantage of a revolutionary no-tie shoe system that gives them independence and instills a sense of pride.

Although disabled children and adults were the last thing on the mind of triathlete Reggie Senegal when he came up with the idea for SnapLaces®, the laces have not only improved the daily lives of many people, they have also improved the competition times of the triathletes for whom they were originally designed.

A determined man and accomplished athlete, who once ran a sub-four minute mile during a triathlon competition, Senegal realized that he was spending over a minute getting his running sneakers on during the transition of his bike ride and run, which counted against his time.

Traditional laces are awkward and tying them can be time-consuming, especially during a race when the athlete is nearing exhaustion. “Oftentimes your hands are cold and shaking. So it’s not as easy as tying your shoes in a regular situation,” says Senegal. After an endless market search for a solution, Senegal set out to find a better way to tie his shoes.

The result, SnapLaces, doesn’t involve tying at all. Instead, the system incorporates elastic bungee-type laces that thread through the holes in shoes and are cinched by a plastic clip that locks them in place. The clip takes advantage of the tension in the elastic material, keeping the lace firmly secured and permitting easy tension adjustment for various compression levels and lengths of lace. SnapLaces allow shoes to be tightened quickly, with only one hand.

Snap to It

In addition to being a competitive athlete, Senegal proved to be an excellent prototype designer. He fashioned the first version of his invention with parts harvested from a backpack, modifying them to create the clip. He then designed nine major iterations before settling on the final specification he took to market.

During the design process, Sengal tried to keep the product simple and easy to use. “My thinking in that process was minimization. No excess lace, just a nice clean even pull across the bridge of your foot, clip it in, and you’re done,” recalls Senegal. He changed the lace pattern from the traditional criss-cross pattern to a straight pull across the bridge of the shoe, but a toothed cleat added to the bottom of the plastic clip clinched the invention. This allowed the laces to be tightened and held in place with a single pull, with no need for additional features.

The development process for SnapLaces was relatively inexpensive. Since the parts and pieces were small and uncomplicated, Senegal was able to self-fund the development and make iterations quickly. The later-stage prototypes were completed with 3D printing. The final phase of the process utilized injection molding.

Early in the prototype process, Senegal filed for two patents, both of which are pending. While an attorney filed the utility patent, Senegal was able to save money by filing the provisional patent at the United States Patent and Trademark Office himself. Although not everyone shares his sentiment, Senegal is pleased with recent patent reforms. He feels that he now has a fair fight against big companies to protect his ideas.

Funding and Factories

Senegal turned to crowdfunding to raise additional capital to begin production. In July 2014, a Kickstarter campaign with a goal of \$20,000 was launched. When the project ended on September 7, 2014, he had more than doubled his goal.

Kickstarter also proved to be a good means for Senegal to receive feedback on the product and hone in on his customer base. He was surprised to discover during the development process that SnapLaces were a hit with people with dexterity issues. "It's not just a shoelace," he says. "We've gotten enormous support from amputees, those with cerebral palsy and autism, and others with limited mobility...who could not tie their shoes before. Now they have one less thing they need someone to do for them."

When the product was in the design phase, Senegal assumed SnapLaces would be manufactured overseas. As the time came to locate a factory, Google searches indicated an injection molding facility a few miles from his office. Senegal also found a domestic facility to make the elastic laces.

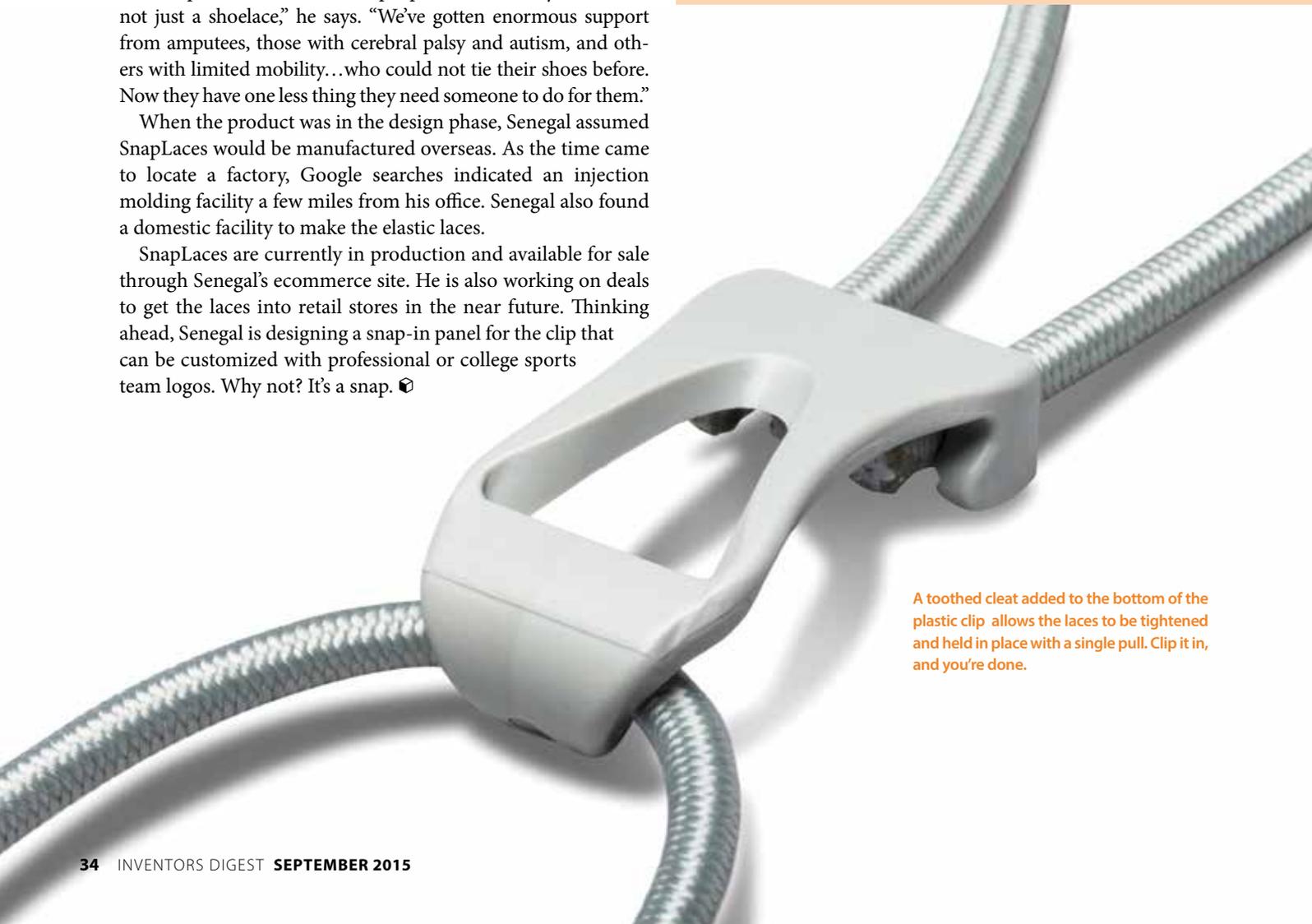
SnapLaces are currently in production and available for sale through Senegal's ecommerce site. He is also working on deals to get the laces into retail stores in the near future. Thinking ahead, Senegal is designing a snap-in panel for the clip that can be customized with professional or college sports team logos. Why not? It's a snap. 📌

A History of Laces

Though no one has determined exactly when shoelaces were invented, their history goes hand-in-hand with shoes. The earliest archeological record of shoelaces dates to 3500 BC, with the discovery of a primitive shoe composed of a piece of leather tied with laces that passed through holes.

Ancient Greeks wore sandals with rawhide lacing, but it was Roman soldiers who popularized shoes and introduced shoelaces to Western Europe. The Museum of London has examples of Medieval footwear from the 12th century, which show laces passing through a series of hooks and eyes down the front or side of the shoe.

Although there was a period during the 16th-century reign of Louis XIV, when buckles and buttons were the height of fashion and prestige, after the American and French Revolutions, laces resurged in popularity. Traditional shoestrings, which were invented in England in 1790, have been the preferred method of securing shoes to our feet ever since.



A toothed cleat added to the bottom of the plastic clip allows the laces to be tightened and held in place with a single pull. Clip it in, and you're done.



Kara Stoll Sworn In as Newest Judge on the Federal Circuit

BY GENE QUINN



PHOTOS COURTESY OF GENE QUINN

Kara Stoll, a former partner at Finnegan, Henderson, Farabow, Garrett & Dunner, was recently confirmed by the United States Senate for a seat on the United States Court of Appeals for the Federal Circuit. The vote was unanimous, with a resounding 95-0 in favor of confirmation. She took the oath of office July 17, filling a seat vacated by the retirement of Judge Randall Rader.

Stoll was nominated by President Barack Obama on November 12, 2014 and was approved by the Senate Judiciary Committee in an Executive Business Meeting of the Full Committee on April 15, 2015. Her nomination pended for slightly less than eight months, a relatively short time considering the log-jam of other nominees to the federal courts.

POLITICO reported that Stoll's nomination is the only judicial nomination the Senate is likely to take up any time soon. Her confirmation, the publication says, is historic because Stoll is the first minority woman to serve on the Federal Circuit.

Patent Person

Stoll worked at Finnegan from 1998 to 2015 and focused on patent litigation, primarily in the consumer electronic, computer, software and medical device industries, before the Federal Circuit, the court she now serves. She represented clients in more than 35 appeals that covered a range of technology and legal issues. In addition, she has represented clients in appeals to the Patent Trial and Appeal Board of the United States Patent and Trademark Office.

Stoll is a "patent person" through and through, and she will be an excellent addition to the Federal Circuit. Stoll not only brings a wealth of appellate and litigation experience from her tenure at

Kara Stoll is a "patent person" through and through, and she will be an excellent addition to the Federal Circuit.

Finnegan, she also spent six years at the USPTO, serving first as a patent examiner in the area of computers and display technologies, and then as a law clerk with the Solicitors Office and the Board of Patent Appeals and Interferences, the predecessor to the PTAB. After leaving the USPTO, Stoll clerked for Judge Alvin Schall of the Federal Circuit.

While maintaining a thriving legal practice, Stoll served as an adjunct professor at Howard University School of Law from 2004 to 2008. She has been an adjunct professor at George Mason University School of Law since 2008.

Stoll holds a Bachelor of Science degree in electrical engineering from Michigan State University. She received her Juris Doctor in 1997 from Georgetown University Law School. 📧

Gene Quinn is a patent attorney, founder of IP-Watchdog.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.





Biotechnology and Pharmaceutical Lobby for IPR Fix

TO INSULATE PATENTS FROM CHALLENGES BY GENE QUINN

In a recent op-ed published by *The Hill*, Jim Greenwood, president and CEO of the Biotechnology Industry Organization, and John Castellani, president and CEO of the Pharmaceutical Research and Manufacturers of America, argue that something must be done by Congress to stop inter partes review trolls from attacking biotechnology and pharmaceutical patents. In support of their position, Greenwood and Castellani point out: “When Congress created the IPR process as part of the America Invents Act of 2011, it never intended for IPR to be used to kill valid biopharmaceutical patents. ...”

Greenwood and Castellani explain the problem facing the biotechnology and pharmaceutical industries in this way:

An immediate problem is that the inter partes review process at the U.S. Patent and Trademark Office, which is intended to provide a faster and cheaper process for people to challenge patents, is being abused by outside interests, including hedge funds, seeking to undermine and exploit it for short-term financial gain.

Predatory hedge funds are short-selling the stock of patent-dependent companies, then challenging the companies’ legitimate patents at the PTO to rattle the stock market, and then attempting to profit from a resulting drop in the companies’ stock price.

An egregious example is the hedge fund manager who recently filed IPR challenges to the patents held by Acorda Therapeutics, a small biotech company that developed and brought to market a new treatment that improves multiple sclerosis patients’ mobility. After the first IPR challenge to Acorda, investors lost more than \$150 million in value, and the stock has yet to recover.

The legislative history of the America Invents Act shows there is no doubt that inter partes review was not intended to allow the type of gaming that troubles Greenwood and Castellani. The intent of post-grant procedures was to give those with a justiciable grievance a cheaper, faster forum in which to challenge a patent. Unfortunately, the legislative history is silent, however, with respect to the type of challenge brought by hedge fund managers seeking to take advantage of a market opportunity.



Problems with IPR

Greenwood and Castellani will have two major problems as they seek relief. First, the IPR provisions do not include a standing requirement, which means that anyone can bring an IPR for any reason. This is complicated by the fact that covered business method challenges specifically and unambiguously require standing to bring a CBM challenge. Using standard canons of statutory construction, it will be argued that Congress was aware of the possibility of requiring standing and opted to include such a requirement for CBM, but also opted not to incorporate a standing requirement for IPR.

The second problem is potentially more challenging. During the last hearing of the House Judiciary Committee, there was an attempt to insert language via amendment that would make it impossible for certain biotech and pharmaceutical patents to be challenged using any post-grant challenge (i.e., IPR, CBM or post-grant review.) Judiciary Chair Rep. Bob Goodlatte, R-Va., vociferously objected, saying that an IPR fix would create a so-called scoring problem with the Congressional Budget Office. What this means is that if this relief were provided for the biotech and pharmaceutical industries, as desired by Greenwood and Castellani, it would cost the federal government money and increase the deficit, unless offset elsewhere.

Insulating biotech and pharmaceutical patents from a post-grant challenge would cost the federal government money because

MICHAL ROZEWSKI/HEMERA/THINKSTOCK

“When Congress created the IPR process as part of the America Invents Act of 2011, it never intended for IPR to be used to kill valid biopharmaceutical patents. ...”

— JIM GREENWOOD, PRESIDENT AND CEO
OF THE BIOTECHNOLOGY INDUSTRY ORGANIZATION



it is anticipated that at least some expensive drugs will get the ax in post-grant challenges at the Patent Office at the hands of the Patent Trial and Appeal Board. When those expensive, patented drugs are lost in post-grant challenges, the federal government will save significant sums by being able to immediately buy generic drugs, resulting in less Medicare spending.

What an admission by Goodlatte. Post-grant challenges were never anticipated to be used to take advantage of money-making opportunities in the manner of certain hedge fund managers. Yet, relief seems unlikely, because the federal government will benefit, as will insurance companies, if these biotech and pharmaceutical patents are removed.

Irony of AIA

The irony here for the pharmaceutical industry is enormous. It is widely known within the industry that one of the primary architects of the America Invents Act was Bob Armitage, the former general counsel for Eli Lilly. He was intimately involved with the drafting of the language of the AIA and with lobbying the industry—and Congress—to pass the AIA. After the AIA passed, Armitage was invited to speak at virtually every gathering of patent industry professionals.

Today, provisions of the AIA are viewed as potentially leading to the death of some pharmaceutical and biotechnology companies. In retrospect, it was an enormously poor decision for the biotech and pharmaceutical industries to support the AIA.

The post-grant challenges were ill-conceived from the start. After spending five to 10 years and \$50,000 to \$100,000 to obtain a patent, the new patent owner of a patent that covers a commercially viable innovation will find the patent challenged after the fact. The patent owner will need to spend between \$500,000 to \$1,000,000 to fight to keep the patent; all of the procedural and substantive laws will favor the challenger; and about 75 percent of the claims reviewed will be lost. Post-grant proceedings make a mockery of the patent system. Why would

anyone spend all that time and money if the Patent Office rules in his favor only 25 percent of the time?

As a firm believer in the patent incentive, I sympathize with the biotech and pharmaceutical industries. The evidence is overwhelmingly clear: Patents foster innovation. If we want ever better medical innovations we need a robust patent system, which we simply do not have today. Having said that, if IPR is such a wonderful thing for the patents owned by other people, why isn't IPR such a wonderful thing for biotech and pharmaceutical patents? If IPR, for example, is the gold standard in ensuring patent quality, then all patents must be subjected to IPR equally. Carving out a special niche for biotechnology and pharmaceutical patents is nonsense and fundamentally unfair.

Patents foster innovation. If we want ever better medical innovations we need a robust patent system, which we simply do not have today.

The Effects of Hatch-Waxman

The argument that certain biotech and pharmaceutical patents should be immune from post-grant challenges because they are subject to challenge under Hatch-Waxman is a complete red herring. Hatch-Waxman has been rendered thoroughly useless over the last decade. Hatch-Waxman challenges delay entry of generic drugs to the market and transfer wealth from brand-name drug

companies to generic companies in exchange for not entering the marketplace. Of course, the argument (made by several senators and reported in the August edition of *Inventors Digest*) that IPR prevents generic drugs from getting to market quickly is false. If an IPR is successful, the patent is lost and generics can enter the market. Hatch-Waxman is the procedure that gets in the way of generic drugs entering the marketplace.

So where does this leave us? It is hard to tell. Lobbying for an IPR fix for the biotechnology and pharmaceutical industries has been strong at the highest levels. CEOs have been coming to Washington, D.C., which shows just how important this issue is to the industry. If such a high level of lobbying continues, it seems inevitable that the biotech and pharmaceutical industries will get what they want, one way or another. Time will tell. ☒



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The Looming Patent Nightmare

FACING THE PHARMACEUTICAL INDUSTRY

BY GENE QUINN

We are witnessing an erosion of patent rights due to Supreme Court decisions relating to the bio-tech and software sectors, both of which the United States currently dominates. How long can this economic dominance continue in an uncertain climate?

Ironically, these sectors create stable, high-paying jobs with excellent benefits for employees ranging from receptionists and janitors to senior researchers and corporate executives. These are the exact types of jobs politicians say we need and that our country should be creating. Sadly, as the result of legislating patent policy from the bench, a non-elected Supreme Court that doesn't seem to know the first thing about technology is about to upend America's high-tech economy. The actions of the Supreme Court will only make this jobless recovery longer, deeper and more difficult.

Thankfully, the Supreme Court is not the last word in our system of government. Congress has the final say. It can overrule Supreme Court decisions and chart a different course for America. Sadly, Congress is dysfunctional and many leaders on both sides of the aisle seem to be driving the patent reform bus at the behest of Google, Cisco, JCPenney and others. Congress is not much help, at least for now.

I have long believed that the patent system will continue to play a dangerous game of chicken with our economic future until the pharmaceutical industry starts to feel the pain that it has so carefully crafted for itself. Once this happens, Congress will step in and fix the patent disaster that it and the Supreme Court created. The pharmaceutical industry may feel the squeeze of our new anti-innovation patent system sooner than many believe.

Challenges to Drug Patents

Talk about shooting yourself in the foot. The pharmaceutical industry was the primary driver of the America Invents Act. Without the pharmaceutical industry on board, we probably would still be arguing about first to invent versus first to file. The pharmaceutical industry drafted much of the AIA, so it is truly ironic that some companies are facing serious challenges to blockbuster patent drugs. Challenges ushered in by the AIA make it much easier to invalidate patent claims, given that there is no presumption of validity, and the Patent Trial and Appeal Board applies the broadest reasonable interpretation of the claims, rather than narrowly reading them, as a district court would.

The real pain for the pharmaceutical industry is on the horizon. There are companies that have already investigated new antibiotics

with remarkable promise, but they have been unable to obtain patent protection on these compounds thanks to the Supreme Court's rulings in *Mayo v. Prometheus* and *AMP v. Myriad*. For example, U.S. Patent Application No. 20140194345 (published July 10, 2014) relates to a novel depsipeptide to treat antibiotic-resistant bacterial infections. Unfortunately, the compound claims of the patent application were rejected by the patent examiner, resulting in a cancellation by the applicant. Did the Supreme Court really mean to say that certain life-saving antibiotics are no longer patent eligible? That is exactly how Supreme Court rulings are being interpreted.

Simply stated, if pharmaceutical companies cannot get patent protection, there is zero percent chance that they will continue to bring drugs to market. Why spend hundreds of millions, possibly billions, of dollars to navigate a byzantine FDA process, only to have a generic company copy the drug. In the end people will suffer or die.

Obviousness Not Obvious

Even if we sort out the patent eligibility issues for the pharmaceutical industry, another problem looms large. In 2007 the United States Supreme Court issued a decision in *KSR v. Teleflex* that makes it harder to obtain a patent on things that the decision maker subjectively thinks are obvious. Prior to this ruling, the law of obviousness was tethered to an objective standard, but the Supreme Court thought that allowed too many things to be patented. We now have a test that is akin to beauty being in the eye of the beholder—it is entirely subjective.

The obviousness problem for the pharmaceutical industry is very real, based on the development of what are known as the “lead compound cases.” It is a bit of an exaggeration to say that once a lead compound has been identified, the drug invents itself,

If pharmaceutical companies cannot get patent protection, there is zero percent chance that they will continue to bring drugs to market. Why spend hundreds of millions of dollars, possibly billions, to navigate a byzantine FDA process, only to have a generic company copy the drug instantaneously.

but not much of one. The truth is that when a handful of lead compounds that could potentially offer the functionality sought are identified, the compounds are worked up one by one, and testing begins. The innovation for pharmaceuticals is in discovering the lead compound.

If there is a small number of lead-compound candidates to pursue, then it is “obvious to try” each. Any resulting compound would be considered obvious, no matter how revolutionary. This wasn't always the case. An “obvious to try” rationale to render a claim invention obvious was explicitly forbidden, at least until the Supreme Court issued its decision in *KSR*. Today “obvious to try” is a legitimate reason to find a claim obvious.

The development of “obvious to try” rejections isn't the only problem for the pharmaceutical industry. For example, in *Myriad*, Justice Thomas, writing on behalf of a unanimous Court, stated that

discoveries are not patent eligible. That should have been shocking to the pharmaceutical industry, given that discovery is the nature of the business. Of course, the statute the Court was ostensibly interpreting—35 U.S.C. 101—states the opposite. In fact, the statute specifically and unambiguously states that discoveries are patent eligible. Therefore, despite what the Supreme Court says, or wishes, discoveries are indeed patent eligible.

To my knowledge, no tribunal has held a drug to be patent ineligible because it merely represents a discovery, but that will come soon enough. The Patent Office is already rejecting drugs based on the fact that revolutionary new antibiotics were merely discovered, so it seems only a matter of time before the courts get involved. Even as we wait for the inevitable expansion in the judicial exceptions to patent eligibility, which will ignore the explicit language of the statute, the pharmaceutical industry has bigger problems.

Software and Drug Compounds

To a large extent, the pharmaceutical industry relies on computer programs in order to identify the lead compounds that will be worked up and tested. According to one group of researchers, “Computer-aided drug design plays a vital role in drug discovery and development, and has become an indispensable tool in the pharmaceutical industry.” The irony is enormous. Software, which many courts would declare patent ineligible as being nothing more than an abstract idea, is responsible for the discovery that results in identification of the lead compounds that will be tested. Increasingly, human thought isn't required when identifying the lead compound, a trend that is certain to only accelerate in the future.

(Continued on page 43)



Commissioner for Patents Peggy Focarino Retires

BY GENE QUINN



PHOTOS COURTESY OF GENE QUINN

After 38 years at the United States Patent and Trademark Office, Margaret “Peggy” Focarino officially retired from her position as Commissioner for Patents on June 30, 2015. Focarino joined the USPTO in 1977 as an examiner and worked tirelessly as a public servant in a variety of roles. Focarino performed every job she was given exceptionally well and worked hard to be accepted as an employee of the USPTO at a time when there were few female employees.

“It was a difficult place when I first came here as an examiner because of the lack of diversity. The job is challenging enough without having those additional issues to deal with,” she explains, adding that helping the USPTO become a more diverse workplace was her proudest accomplishment.

One of the Guys

“Frankly, I just tried to be one of the guys when I started, because they were a little nervous around me. I was a woman and they didn’t have much experience working with women, so I tried to blend in,” she continues. “Today our examiners come here and they’re celebrating their diversity, and that’s just the most special and wonderful thing to me.”

There is no doubt that Focarino was a trailblazer. As the first woman to become Acting Commissioner for Patents, the first woman to be named Commissioner for Patents and a member of the first all-female leadership team in the history of the USPTO, Focarino witnessed dramatic change at the agency over the past four decades.

Focarino expressed that one of her goals was to make the USPTO the top place in the federal government to work—a goal she achieved last year and of which she remains proud, even if the office slid to No. 2 in the most recent ranking. Under Focarino’s guidance, the USPTO came a long way from the 25th-best recognition it maintained during the 1970s.

Since a few senior members of management left this summer, many believe there is a shakeup coming to the USPTO, but that is far from true. In fact, Director Michelle Lee said she tried to talk Focarino out of retiring, telling her, “Thirty eight years is an odd number, why can’t you make it 40?”

Although Focarino is not sure what she will pursue next, it is more than likely that she will remain in the industry in some capacity for years to come. She says she is “leaving the office,” not retiring.

Why Did She Leave?

Focarino says she thought about leaving after the USPTO became the top place in the federal government to work, but the timing wasn’t right. At the beginning of any new presidential administration, it is customary for appointed officials from the previous regime to step down, offering the new president their resignation. This means that, until the president’s new team is nominated and confirmed, career employees rise to hold provisional positions. At the beginning of the Obama administration, Focarino became Acting Commissioner for Patents, the first woman to rise to that level. Upon the confirmation of David Kappos and his team, Focarino returned to her previous job as a Deputy Commissioner for Patents.

She was qualified for retirement and never expected to be named Commissioner. But when Bob Stoll retired, then-Director David Kappos asked Focarino to take the job. She agreed and promised not to retire for two years, although at the time she did let Kappos know that her intent was to remain at the USPTO less than the full five-year term of her contract.

After two years as commissioner, things changed. Kappos was no longer there, and Michelle Lee was single-handedly running the Office as Deputy Director. Focarino understood how difficult Lee’s job was, so she decided that she could not walk away. It would have been unfair to Lee and the Office. Once Deputy Director Russ Slifer joined the USPTO, Focarino knew the timing was right to retire.

Insight and Dedication

The decision to stay past the time she had previously told the Office she would is a perfect illustration of Focarino’s dedication.



Robert Budens gives Peggy Focarino the “Defender of the Patent System” award.

She always believed in the mission of the USPTO and in the patent system. Focarino was not about to leave when the senior management team was down one leader due to a long and protracted nomination process.

Focarino has a reputation as a doer. If someone wanted something accomplished on time, Focarino was put in charge. Perhaps the best illustration of this is when Director Kappos wanted to renegotiate the examiner quota system for the first time

in a generation. Kappos turned to Focarino, and a new system was agreed upon within six weeks. To call that unprecedented isn't enough. Negotiations with any union are a delicate dance, even under the best of circumstances. Changing the definition of “workload” should have required a long and protracted negotiation. Instead, undoubtedly, as the result of the trust developed between Focarino and the union over many years, the negotiations were successfully concluded in a fraction of the time expected.

The Patent Office lost an extraordinary resource in Focarino. As Deputy Commissioner for Patents Administration Bruce Kisluk said speaking at her retirement party, “She knows the culture of this agency like no one else.”

Focarino's departure marks the end of an era at the USPTO. While there are many capable deputies and assistant deputies within the USPTO, no one in senior management can come close to her years of service. Of course, as one chapter closes a new chapter always begins. A dedicated team, led by Focarino's replacement, Drew Hirshfeld, will carry the Office forward admirably. ☺

EDITOR'S NOTE: LOOK FOR AN INTERVIEW WITH DREW HIRSHFELD IN THE OCTOBER ISSUE OF INVENTORS DIGEST.

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Senator John McCain

SAYS U.S. NATIONAL SECURITY DEPENDS ON ACCESS TO INNOVATION

BY GENE QUINN

United States Sen. John McCain, R. Ariz., chair of the Senate Armed Services Committee, provided keynote remarks about innovation and security in late July at the United States Chamber of Commerce in Washington, D.C. McCain's remarks related to defense acquisition reform and the need for the Department of Defense to streamline the acquisition of new, innovative technologies.

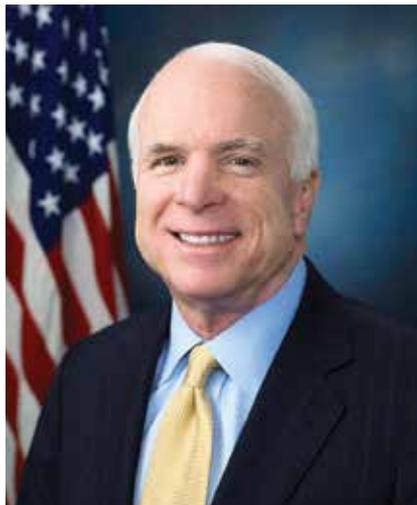
McCain, who over the last several months has proposed sweeping acquisition reforms, told the audience that "our Defense Department has grown larger, but less capable; more complex, but less innovative; more proficient at defeating low-tech adversaries, but more vulnerable to high-tech ones." He also explained that "the Department of Defense must be able to access innovation in areas such as cyber, robotics, data analytics, miniaturization and autonomy—innovation that is increasingly likely not to come from Washington or the defense establishment."

McCain illustratively commented, "Innovation is measured in 18-month cycles in the commercial market. The Defense Department has acquisition cycles that can last 18 years." McCain also pointed out that the Department of Defense "spent \$46 billion between 2001 and 2011 on at least a dozen programs that never became operational."

There is no doubt that the acquisition system employed by the Department of Defense is broken. With such a large agency, a woefully inadequate response to technological advances and adoption of cutting-edge innovation should be anticipated.

Time Management

Anyone who has ever done business, whether personal or professional, with the government has to know that a stark difference exists between government time management and time management in



"Our Defense Department has grown larger, but less capable; more complex, but less innovative; more proficient at defeating low-tech adversaries, but more vulnerable to high-tech ones."

— SEN. JOHN MCCAIN, R. ARIZ.

the private sector. There are numerous reasons for the lethargy of government, but it is hardly surprising that the Department of Defense finds itself wholly incapable of existing in an innovation marketplace that McCain rightly characterizes as being measured in 18-month increments.

According to the Defense Department website, the United States military apparatus has more than 1.4 million active duty military personnel, 718,000 civilian personnel and 1.1 million National Guard and Reserve forces. This makes the Department of Defense the largest employer in the United States. To give additional perspective, the Pentagon has triple the floor space of the Empire State Building.

Large, established private-sector companies eventually lose the ability to innovate. Innovation overwhelmingly occurs in small companies and entrepreneurial start-ups; in research labs and universities; and in the garages of the classic independent inventor or the basement of a laid-off engineer, who finally has time to work on his own projects.

When any company gets too large, it loses the ability to innovate. We have seen this play out time and again throughout history. The most innovative breakthroughs almost universally come from small enterprises, research institutions and individuals. It is the rare exception when a large entity comes up with something truly revolutionary.

Small Enterprises Best Innovators

One example of a large entity that continually pushes the envelope is IBM—but it is the exception, not the rule. Despite IBM's size, the company has long engaged in purely speculative research, which means a portion of the IBM research and development team intentionally operates like an academic or research institution. For every Watson invented by a large company are dozens of revolutionary innovations made by much smaller enterprises.

As a company grows, decision making becomes remote and is handled by layers of bureaucracy. Large, established companies in the technology sector tend to be publicly traded companies that have divergent interests and issues that require attention, taking management's eye off the ball. These publicly traded companies also have shareholders to please, and most CEOs operate on a three-year horizon, or less. A significant number of high-tech CEOs operate on a quarter-to-quarter basis, chasing stock prices ever higher, without an intermediate or long-term plan.

While innovation life cycles tend to last for 18 months, truly revolutionary

PHOTO COURTESY OF GENE QUINN

innovation cannot happen in that short timeframe. Paradigm-shifting innovation requires many years of planning and a culture that will support the development life cycle.

No longer nimble and responsive, a corporate structure that isolates innovators from executives simply does not support a vibrant innovation ecosystem. Too many layers between a potentially promising innovation and the visionary who can champion the project is precisely why large tech companies buy nimble, exciting and innovative smaller companies. Apple, Google, Facebook, Oracle, Cisco and virtually every large pharmaceutical and biotechnology company have fallen prey to their own size and lethargy.

We know the private sector is far more nimble and responsive than the public sector, and we also know that giant tech companies have lost the ability to come up with paradigm-shifting innovation in all but the most extreme, outlying cases. Why then should it shock anyone that the Department of Defense, the largest employer in the United States, finds it impossible to innovate or adopt outside innovation within any relevant time frame?

Like massive corporations that have become too bloated to innovate, the answer for the Department of Defense is to become smaller, more nimble and less afraid of failure. This is not to suggest that Congress should shrink the military or lay off civilian employees. Instead, if

achieving and adopting more innovation is the goal, the answer is to break apart the innovation responsibilities from the agency that has grown too large to do anything other than stifle innovation.

McCain ended his remarks by saying that the problems facing the Department of Defense can be solved “if we create an acquisition system that enables the Department of Defense to take advantage of the creativity and ingenuity of America’s innovators and entrepreneurs.” To this I simply say, “Amen!” Of course, facilitating America’s innovators and entrepreneurs means Congress cannot further complicate the patent system that is so necessary for innovators and entrepreneurs to succeed. ☛

The Looming Patent Nightmare (cont. from page 39)

So the discovery, which the Supreme Court says isn’t patent eligible, is achieved by a software program that the Supreme Court says isn’t patent eligible. But wait, there’s more. Even if you overcome the reality that there is no human inventor contributing conception, how is it possible for a drug conceived by software to be anything other than obvious? Once the computer identified the lead compound candidates, it would seem that those candidates would by definition become obvious to try. Further, a technician could work up those obvious to try compounds and test them for efficacy.

To date, the pharmaceutical industry hasn’t been able to get a legislative solution to solve the inter partes review problems it faces with hedge fund manager Kyle Bass. In fact, during the last hearing of the House Judiciary Committee, there was an attempt to insert language via amendment that would make it impossible for

The pharmaceutical industry will get no legislative help for the post-grant challenge problem because the federal government likes the idea of patents on important drugs being invalidated, which will save on Medicare funding.

Kyle Bass and others to challenge pharmaceutical patents via post-grant challenge at the Patent Office. Judiciary Chair Rep. Bob Goodlatte, R.Va., vociferously objected, saying that if the amendment to prevent post-grant challenges to pharmaceutical patents passed, it would create a so-called scoring problem with the Congressional Budget Office.

Medicare Savings

The government will need to offset the cost of enacting legislation. Insulating pharmaceutical patents from a form of challenge no one ever envisioned they would be subjected to would cost the federal government money, because at least

some expensive drugs will fall in post-grant challenges at the Patent Office. When those expensive, patented drugs are lost in post-grant challenges, the federal government will save significant sums by being able to buy generic drugs.

What an admission by Goodlatte. The pharmaceutical industry will get no legislative help for the post-grant challenge problem because the federal government likes the idea of patents on important drugs being invalidated, which will save on Medicare funding.

The way things are heading, pharmaceuticals may not be patentable. That would be a truly tragic development. ☛

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