

Inventors

AUGUST 2017 Volume 33 Issue 08

DIGEST

SAFE!

JOHNNY BENCH

Fights Bullying With Mobile App for Schools

MORE NEW SAFETY INNOVATIONS

Congressman is Protecting Patents OUTSPOKEN ALLY, LONGTIME INVENTOR

Connecting on Connected Things LEARNING FROM IOT MEETUPS

An Instagram Success Story MARKETING BOOSTS PHONE ACCESSORY



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Larger-Than-Life Star is Relishing a Larger Purpose



As a boy from Dayton, Ohio, who was a Cincinnati Reds fan, there was so much I didn't know about Johnny Bench. Now as I follow the arc of his post-playing life after all those years of following the arc of his majestic home runs, I'm delighted by what I learn.

Even non-baseball fans can appreciate the notion of being the best in one's profession. A member of Major League Baseball's Hall of Fame and all-century team, Bench is generally regarded as the best to ever play the game as a catcher, the sport's most grueling position. That distinction is in large part due to the fact that he was a winner: When the Reds won back-to-back World Series in 1975-76—the first National League team to do so in more than 50 years—they earned comparisons with the best teams that ever played. Bench was named the league's most valuable player twice during a seven-year span in which the Reds made the Series four times.

Today we see Bench the businessman, the face of Johnny Bench Enterprises and a national TV pitchman for products ranging from paint to pain creams. Mature beyond his years even in his youth—he had his own syndicated TV show in his 20s—he's a comfortable, articulate speaker who understands a larger purpose and the fact that, as he once said at a black-tie event, "eventually, the battery gives out for all of us." (His almost gave out before we got a chance to appreciate him; Bench survived a 1965 school bus accident in his native Oklahoma that killed two classmates and then lung surgery in his early 20s.)

As a player, he rarely showed a lot of emotion. Yet during our interview about his company's Smithfield School anti-bullying app, I was impressed with the passion in his voice. Bench never forgot that he was bullied as an eighth-grader, and can recite passages of the anti-bullying kids book "Blackbird Fly" as though they were a scouting report on a rival Hall of Famer. He is proud to have school-age sons who understand the importance of the fight against bullying, which has extra challenges and urgency in our 24/7 wired-in world.

This month's issue of *Inventors Digest* highlights the efforts of Bench and other winners who are using innovation as a way to protect others. This further underscores the crucial importance of inventing, and why we need to encourage and reward the entrepreneurial spirit from the grassroots level to the Supreme Court.

—Reid
(reid.creager@inventorsdigest.com)

Correction: Due to a production error, some extraneous lines were added in the first paragraph of the Simple Scrub story in the July 2017 issue (page 14). The paragraph should have read, "Grandma knows best. And many grandmas know cleaning." The corrected version is at inventorsdigest.com.

INGENUITY IS AMERICA'S MOST VALUABLE RESOURCE.

DON'T TREAT IT LIKE A CHEAP COMMODITY.

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

**SAVE THE
AMERICAN
INVENTOR**

TAKE ACTION AT SAVETHEINVENTOR.COM



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photo courtesy of
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Focus on the Fun and Fascinating

BRIGHT IDEAS

Chameleon Pack

BACKPACK VERSATILITY

trailform.com

This backpack transforms into an ultra-light chair, among other features. Its main function is to provide superior portability and allow you to carry less.

The Chameleon separates to form two backpacks. Each backpack includes two 16-liter removable stuff sacks that hold all of your gear. They can be carried independently as separate drawstring slings or can connect to form a 32-liter drawstring backpack.

To enable the chair, unzip the backpack, arrange the collapsible Sit-System frame, attach the pack to the frame, then sit back. The removable Switch Bags that hold all of your gear will drape over the sides of the chair so you can easily access what you need.

With a future retail price of \$247, the Chameleon will begin shipping to Rewards backers in November.



Ahead

SMART HELMET DEVICE

analogue-plus.com

A lightweight, portable Bluetooth device, Ahead mounts to virtually any helmet to provide a safe, hands-free audio system to listen to music, make phone calls and follow GPS navigation.

A key feature is the device's absence of a speaker. The patented technology uses an oscillator to send the transmission throughout the surface of the helmet. With the built-in microphone and voice-capture technology, you can also utilize Siri.

Ahead weighs just 65g (2.3 oz.) and snaps securely onto your helmet with one of three slide brackets. No tools are needed for installation, and you can transfer the device from one helmet to another.

Shipping is set for October, with a planned retail price of \$120.



Cero One

COMPACT ELECTRIC CARGO BIKE

cero.bike

Billed as a super utility vehicle, Cero One has a modular front and rear cargo system with myriad options: three sturdy aluminum baskets that mount in the front and rear racks for up to 12 possible configurations.

The bike has up to 20 mph of pedal-assisted boost and up to 93 miles of battery range. A smaller, 20-inch wheel in the front increases the volume of cargo that can be carried above the front rack. The front wheel, coupled with 180mm disc brake rotors, provides better stopping power. The step-through frame allows for easily dismount and rest when stopped at a traffic light.

Cero One will retail for \$3,400. Shipping to backers is to begin in November.

“The desire to fly is an idea handed down to us by our ancestors who . . .
looked enviously on the birds soaring freely through space . . .
on the infinite highway of the air.” —WILBUR WRIGHT

FODI

ORIGAMI STAND

fodi.jp

Weighing just 40g and 1mm thick—thin enough to be a bookmark—FODI uses the traditional Japanese art form of origami to provide a base that is strong enough to hold a laptop in place while being aesthetically appealing.

FODI can hold up to 44 lbs. Predefined sections fold naturally into place with magnets. The two main positions provide two different angles of screen elevation. Its ability to support laptops and smartphones helps the user maintain perfect posture to avoid injuries and pain associated with slouching for sustained periods.

FODI comes with magnetic buckles in two different sizes so they will fit all charging cables. It will retail for \$20, with shipping to backers scheduled for October.



More Than Sweet Serendipity

'ACCIDENTAL' INVENTOR OF MICROWAVE OVEN MADE HIS OWN LUCK

When it comes to 20th century invention legend, this may be the ultimate: An engineer testing a new vacuum tube called the magnetron in the mid-1940s discovers that the candy bar in his pocket has melted. Intrigued, he places popcorn kernels near the tube and watches them explode all over the lab.

Dr. Percy LaBaron Spencer—whose original U.S. patent 2,495,429, “Method of Treating Foodstuffs,” was filed October 8, 1945 and granted on January 24, 1950—became the inventor of the microwave oven. By the time he died in 1970 at age 76, Spencer held 150 patents and was one of the world’s leading experts in microwave energy. He was inducted into the National Inventors Hall of Fame in 1999.

Although the candy and popcorn anecdotes have the ingredient of serendipity, they also reflect the curiosity and hunger for knowledge that consumed Spencer despite his dropping out of grammar school at age 12.

Wartime importance

Born in Howland, Maine, he was 18 months old when his father died. His mother left him in the care of his aunt and uncle, the latter who died when Spencer was 7. He eventually left school to support his aunt, and from ages 12-16 worked sunrise to sunset at a spool mill. All the while, he was teaching himself about electricity and joined the U.S. Navy at 18 as a radio operator.

During his Navy stint, he taught himself a number of science-related subjects. “I just got hold of a lot of textbooks and taught myself while I was standing watch at night,” he is quoted as saying at

atomicheritage.org. He joined the American Appliance Co. in Cambridge, Massachusetts, which later became the Raytheon Company, following World War I.

Advances in and reliance on radar technology during combat played a major role in Spencer’s success as a physicist and inventor. During World War II, the British contracted Raytheon to mass-produce combat radar equipment featuring magnetrons—used to generate the microwave radio signals that are the core element of radar. Spencer developed a mass-production system for the magnetron that raised its output to 2,600 daily and ultimately received the Navy’s highest civilian honor, the Distinguished Public Service Award.

One day while building magnetrons, he was standing in front of an active radar set when he noticed the melted candy bar. Although anyone working around the magnetron “burn-in” stand knew that nearby objects would start to heat up if in the direct path of this high-powered microwave radiation, no one had investigated it.

He created the first microwave oven by attaching a high-density electromagnetic field generator to an enclosed metal box. The magnetron emitted microwaves as the box blocked their escape. He put various food items in the box and observed what happened to them while monitoring temperatures.

Other contributors

Spencer’s early microwave-related patents provide evidence that he did not intend for it to be a consumer device. Besides, the high cost of microwave equipment at the time would have prevented this.

Microwaves101.com notes that in his initial patent, “he points out the choice of frequency which provides high heating efficiency, the size of the cavity, and some superfluous details on the magnetron oscillator itself. He envisioned a conveyor belt for parading the food into the cavity, (with) no mention of safety, or how the radiation might be enclosed or how the food might enter the cavity.”

A later patent, granted in 1951, discusses how to “broil” a lobster in a microwave oven by violating it with a “pencil like rod” so that its tail won’t curl up and make it harder to cook.

Dr. Percy L. Spencer held 150 patents and was one of the world’s leading experts in microwave energy.



His second related patent showed how the microwave would pop popcorn. A later patent, granted in 1951, discusses how to “broil” a lobster in a microwave oven by violating it with a “pencil like rod” so that its tail won’t curl up and make it harder to cook.

Spencer wasn’t the only one to examine heating applications—General Electric reported on equipment that would thaw and heat frozen meals in a restaurant—and wasn’t even the only one at his company to work on the microwave oven. According to “The Creative Ordeal: The Story of Raytheon,” by Otto J. Scott (1974), Raytheon officials Lawrence Marshall and Fritz Gross had significant roles.

A particularly underrated contributor was Marvin J. Bock, an electronic engineer who worked at Raytheon for 29 years. As microwaves101.com says, “Using 2.45 GHz to heat popcorn and lobsters must be first credited to Percy Spencer. However, the engineer that reduced the idea to practice, and developed the first practical, commercially viable microwave oven known as the RadaRange, was Marvin Bock.” Another was David Arthur Copson, who led the microwave heating laboratory at Raytheon.

Renown without reward

In 1947, the RadaRange—or RaydaRange in early design prototypes—hit the market. Much like the cell phone, the earliest versions were unwieldy and very expensive. At 5 1/2 feet tall, weighing more than 750

lbs., costing about \$5,000 and including a magnetron tube that had to be water-cooled (requiring plumbing installations), the microwave oven was not greeted with hot public demand.

Refinements resulted in much greater acceptance. Improvements in function, lighter weight and the development of an air-cooled magnetron—no more plumbing installation required—got the attention of restaurants, vending companies and consumers. By 1975, sales of microwaves surpassed sales of gas ranges for the first time.

Spencer went on to considerable more success and renown, though it didn’t translate to monetary reward. He ultimately became senior vice president at Raytheon and was a senior member of its board of directors. A building at the Raytheon Missile Defense Center in Woburn, Massachusetts, bears his name.

His profit for his invention was \$2—a one-time gratuity from Raytheon that all inventors on its payroll received at the time for company patents. 📡

—Reid Creager

The earliest microwave ovens in the late 1940s were big, heavy, expensive and not well received by the general public.



INVENTOR ARCHIVES: August

AUGUST 30, 1968

The song “**Hey Jude**” by John Lennon and Paul McCartney was copyright registered. Released four days earlier, it was recorded at London’s Trident Studios.

One of the last Beatles singles, “Hey Jude” represented many firsts. It spent nine weeks at No. 1 in the United States, the longest stint for any Beatles single; was the first single released on the Beatles’ label, Apple Records; and at 7 minutes, 11 seconds was the longest single to ever top the UK charts.

The pop anthem originated as “Hey Jules” and was devoted to Lennon’s son, Julian, as his parents were going through a divorce. Lennon had separated from his wife, Cynthia, in May in the wake of his affair with Yoko Ono; McCartney is said to have written the song in his car on his way to visiting Cynthia and Julian in June. Lennon said he “always heard it as a song for me.”

The song has been covered by a number of prominent artists, including Elvis Presley. A version by R&B artist Wilson Pickett, also released in 1968, featured a famous guitar solo by Duane Allman.

In 1985, Michael Jackson outbid McCartney to buy the Associated Television Corporation’s back catalogue, which includes the Beatles’ songs, for nearly \$50 million. Sony paid Jackson \$95 million for 50 percent of the rights in 2005.

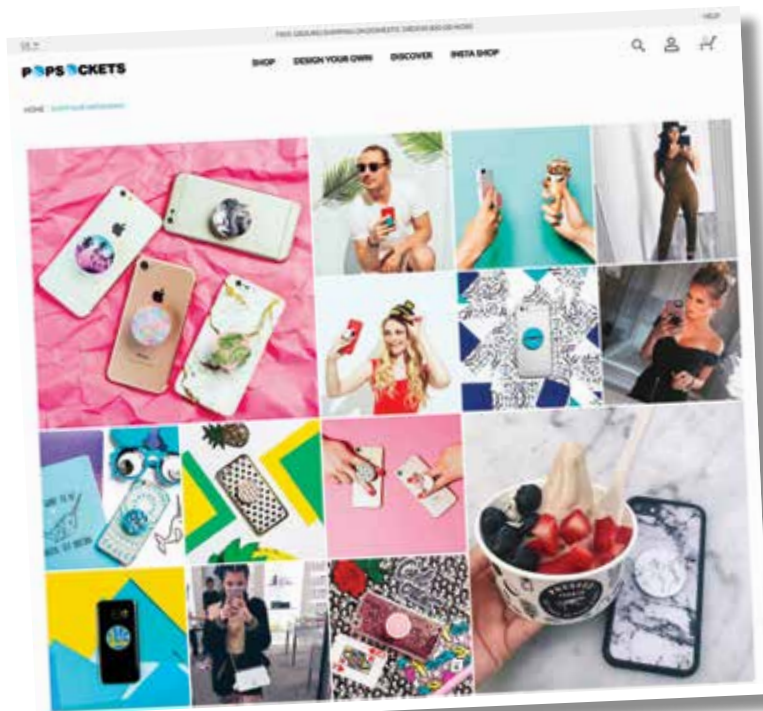
“The annoying thing is, I have to pay to play some of my own songs (live),” McCartney once said. “Each time I want to sing ‘Hey Jude,’ I have to pay.”

However, starting next year McCartney will be able to start reclaiming Beatles songs from 1962. Under the 1976 U.S. Copyright Act, songs written before 1978 revert back to the songwriter after 56 years. This means McCartney could regain control of “Hey Jude” in 2024, the year he would turn 82.



Instagram Marketing Fuels PopSocket's Fast Rise

INVENTORS CAN LEARN FROM COMPANY'S PRACTICAL, CREATIVE APPROACHES **BY ELIZABETH BREEDLOVE**



In 2012, David Barnett of Boulder, Colorado, invented the PopSocket, a mobile phone grip and stand accessory that expands and collapses. During the product's Kickstarter campaign that year, 520 people pledged \$18,591—shattering the new company's \$12,000 goal. In January 2014, PopSockets.com went live, and two years later the company had sold its millionth unit. Now PopSockets can be found in stores such as Best Buy, T-Mobile and other independent retailers.

One of the important reasons for the company's success is that it utilized Instagram early in its development. Since joining Instagram in May 2013, PopSockets has more than 150,000 followers and has posted over 650 times.

So, what can other inventors learn from PopSockets' success on that social media site? According to Katelyn Lavine, the company's Instagram manager, it's important to recognize which social media platforms their users use and connect with the most.

"Our biggest social media platform is definitely Instagram," she said. "We post daily to keep our followers engaged and excited about our products—letting them know about events we will be at, such as VidCon—as well as new product releases. Always having new content to post, as well as posting regularly, is a huge part of creating and maintaining a successful following on Instagram."

Here are five tips for inventors, used by PopSockets to maximize its Instagram exposure:

1 Start with great graphics and videos that show off your product.

When Instagram launched in 2010, one of its primary purposes was to help users enhance their photos through digital filters and then share them. Seven years later, it's safe to say the emphasis has shifted from filtering images to sharing them; Instagram has truly become a social network. Because of this, it's important to have images, photos and videos that show off your product from the get-go.

Although it's OK to apply filters to your images, gone are the days of posting a blurry cell phone photo taken in poor lighting with the Amaro filter applied to lighten it up a bit. When possible, it's best to start with a professionally styled and shot photo or video, or an image created by a graphic designer—though a cell phone image will work in a pinch. PopSockets does a great job with this: Its product photos appear to be professionally shot, with the product on a phone with a solid-colored background, so the PopSocket remains the true focus.

2 Create shareable graphics.

Memes are arguably the driving force of internet culture, especially among millennials. These are cultural symbols or ideas that get virally spread—often in the form of images but sometimes as videos. Users love to share images that make them laugh, or with which they can identify. Instagram is no different, with "meme" accounts such as @beigecardigan and @mytherapistsays becoming some of the most-followed

“Always having new content to post, as well as posting regularly, is a huge part of creating and maintaining a successful following on Instagram.”—KATELYN LAVINE, INSTAGRAM MANAGER FOR POPSOCKET

non-celebrity accounts. In fact, this is a huge part of the “social” aspect of Instagram.

You can easily jump on board this trend by posting graphics that other people will want to share. For example, one Monday in May, PopSockets posted a simple image that said “Less Monday More Summer.” This is a sentiment nearly everyone can agree with and something people are likely to share with friends. When people tag their friends in your images or share your images, it increases your reach and the amount of people who see your post.

3 Use captions that play off your graphics and encourage engagement.

Back to the “Less Monday More Summer” post: PopSockets took this shareable image a step further with the caption “Raise your hand if you’re ready for the summer #mondaymotivation” that included the “hand raised” emoji. The image drew comments from 186 people, most using the same emoji, and another 8,000 liked the post.

When people engage with an image through likes and comments, it makes it easier for those who don’t follow you to see your posts. Even if your followers aren’t tagging their friends or sharing your posts, your image can still show up in the “explore” tab for many users. Note: Your account needs to be public for this to happen—although if your goal is to increase awareness of your project, it should be public anyway!

4 Repost other accounts.

Having enough high-quality, professional images to keep your Instagram feed fresh can be time consuming, overwhelming and expensive. One workaround is to repost content from other accounts.

Lavine explains: “We do what we call “#PopSocketSelfie of the Week,” in which typically every Friday we repost a PopSocket user selfie that they have tagged us in on Instagram. This furthermore drives our consumer engagement in allowing us to showcase our fans and show our appreciation towards their love for our brand and products.”

Using the hashtag “#PopSocketSelfie” to manage this makes it easy to curate a collection of user-generated content. Lavine only has to search the hashtag, find a good picture, comment asking for permission to use it, then post it with credit given to the original account. Most Instagram users love to see their pictures featured by brand accounts.

5 Use hashtags to join trends or promote yourself at events.

Using hashtags in your caption is important for more reasons than just curating content, because they help make you more visible to potential customers. Hashtags—words or phrases preceded by the # symbol—are how posts are categorized on Instagram.

This is a great way to attract new followers, but don’t go overboard. Instagram will not let anyone include more than 30 hashtags per post, and even 30 can be a bit too many. Try to stick to 3-10 per post. If you need to include more, consider placing them in a comment under your caption to keep your caption from becoming cluttered. 📌

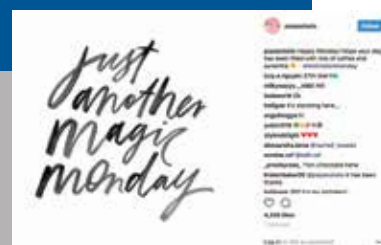
Elizabeth Breedlove is content marketing manager at Enventys Partners, a product development, crowdfunding and inbound marketing agency. She has helped start-ups and small businesses launch new products and inventions via social media, blogging, email marketing and more.



#HashtagHelp

Stuck on what types of hashtags to include in your posts? Check out these ideas for inspiration.

- 1. Event hashtags.** Many events have official hashtags for everyone to use.
- 2. “Daily” hashtags.** Think #SelfieSunday, #ManicMonday, #TriviaTuesday, #WednesdayWisdom, #ThrowbackThursday, #FunFriday, #SmallBusinessSaturday.
- 3. Branded hashtags.** #PopSocket, for example.



Are We Maximizing Car Window Safety?

EVEN WITH RECENT INVENTIONS, AUTOMAKERS' COMMITMENT SEEMS INCONSISTENT BY JACK LANDER

Although automobiles have become increasingly safe in recent years, the record of automakers is not squeaky clean.

Before 1904, cars were a lot like faster-moving, horse-drawn wagons, with more debris from the car ahead thrown in our faces and eyes. The obvious solution was to provide a glass windshield; however, as speeds and traffic increased, so did accidents. In a collision, passengers could experience severe facial injuries—even blindness—from flying plate glass. Worse, a passenger whose head went through the windshield could die from a brain injury or punctured carotid artery.

In 1910, French fabric designer Edouard Benedictus inserted a layer of gelatin between two layers of glass and patented the first practical safety glass. The gelatin laminate lacked the strength we've come to expect from safety glass, but it did prevent or greatly limit flying shards.

One disadvantage to the novel window was that it discolored and became brittle from sunlight over time. Still, by 1920 most automakers had adopted safety glass as standard.

An improved sun-proof resin called PVB (polyvinyl butyral) was created in 1927 by Canadian inventors Howard Matheson and Frederick Skirrow. It was clearer, blocked ultraviolet light, and was claimed to be five to 10 times stronger than previous laminates.

In 1937, safety glass was mandated for all auto windows except the rear. PVB and EVA, (ethylene-vinyl acetate), another high-quality resin, became the standards for safety glass laminating. That should have ended the story.

Unfortunately, automakers' perpetual quest to lower costs caused a detrimental reversal of using side-window

safety glass. In the mid-1950s, automakers were considering switching from safety glass to tempered glass for side and rear windows.

Limits of tempered glass

Tempered glass has greater strength against impacts and is therefore safer under some circumstances. When broken, the entire pane shatters into small, cube-like pieces that are much less likely to cut us—which is nice on shower doors, but not so nice if you are involved in a rollover auto accident. DuPont, a major manufacturer of auto glass, issued a detailed technical report in 1957 about the dangers of using tempered glass.

The automotive industry is showing great interest in substituting tempered glass for laminated glass in the side windows of cars, at least in part to reduce costs. Many familiar with the characteristics of each glass consider such a move to unnecessarily compromise our safety.

When broken, either by impact or striking a hard object in a crash, tempered glass falls out and does nothing to retain passengers inside the vehicle. Laminated glass, even though completely shattered, continues to effectively keep passengers within the relative safety of the car's interior.

DuPont's statement omitted details such as the deaths and terrible injuries that could result when a person's arms or head are partially ejected in a rollover accident. The centrifugal forces applied to one's body during even a moderate-speed rollover are very high and occur too quickly for defensive reactions. Even a person wearing a seat belt is subject to at least partial ejection and death or severe injury. Safety glass had largely prevented full or partial ejection from windows, (unless, of course, they

were open), and little was understood about the potential for substantial increases in such ejections from the easily shattered tempered glass.

In any event, starting around 1959, automakers began using non-laminated tempered glass in all but the windshields, which remained safety glass. Ironically, using seat belts would keep passengers from being fully ejected from windows during rollovers, helping the automakers' cause. They argued that ejections would be rare if we were properly belted in.

Ejection stats tell the story

National Highway Traffic Safety Administration 2003 fatal crash data showed 6,852 persons were totally ejected from their vehicles, 1,730 partially ejected. That's a total of 8,582 deaths.

Data published by NHTSA in 2009 revealed that 13.7 percent of crash deaths resulted from ejections of passengers. Of those, 90 percent were ejected through side windows, 10 percent through doors. Thus, 12.3 percent of fatalities were due to ejections from side windows, essentially all of which were tempered glass in 2009.

There also were many injuries from side window ejection, about two-thirds of which were incapacitating. The average number of fatalities in the United States from 2006 through 2015 was 35,500. Using the 12.3 percent figure above, 4,357 people died due to ejection through side windows that were made of tempered glass.

I could find no direct data on how many people survived because they were not ejected. However, NHTSA reports 35,092 deaths from car accidents in 2015 and estimates that nearly 14,000 people were saved due to wearing seat belts.

Advocates for tempered glass argue that people drown in cars that submerge in rivers, lakes, etc., or die in cars that are on fire—and that the ability to break through a side window could save lives. The National Center for Statistical Analysis says that an average of about 350 people drown in cars annually. I could find no data on the number of people who escaped drowning by breaking through tempered glass side windows.

The American Burn Association states that 310 people died in 2013 from burns in auto accidents. We must note that in 2013, all side windows were made of the more easily broken tempered glass. Again, I found no data on people who escaped being burned fatally by breaking through a tempered glass side window, and escaping from a burning car.

In any event, the average number of ejection fatalities appears to be several times the number of fatalities

from drowning and burning combined. The number of amputations, permanent disabilities and disfigurements from partial ejections also must be considered.

Safety glass also has the benefit of strengthening the roof structure, helping to prevent its crushing during rollovers. All in all, the case for safety glass in side windows appears sound, and Federal Motor Vehicle Safety Standard 226 mandates their inclusion in motor vehicles having a gross vehicular weight of 10,000 lbs. or less by September 1 this year.

The resulting prevention of deaths and injuries from full and partial ejection is good news. But we have to wonder about the indifference of car manufacturers that consider profit over safety. Aren't their shareholders also drivers?

The automotive industry is showing great interest in substituting tempered glass for laminated glass in the side windows of cars, at least in part to reduce costs. Many familiar with the characteristics of each glass consider such a move to unnecessarily compromise our safety.

Side-area air bags add significantly to the safety of passengers in rollovers and side impacts. Some cars have provided them as standard in the past three years. (Check your make and model at iihs.org/iihs/ratings/safety-features.)

As always, safety is mainly dependent on the driver in charge. Don't move your car until everyone, including your immortal teenager, is belted. One thing you don't need in the event of a crash is 150 lbs. of human being catapulted from the back seat and breaking your neck. Don't leave heavy objects in the back seat, or even on the floor.

Always wear your seat belt. Live to invent. ☛

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



Toileting Breakthrough is a Relief

BY EDITH G. TOLCHIN

SQUATTY POTTY MADE ALMOST \$30 MILLION IN 2016



The past few years in particular have yielded an abundance of personal care inventions, three of which I have recently covered (“Take a Stand,” January 2016; “The Restroom Kit,” October 2016; “Epic Wipes,” November 2016).

A few months ago, Stephen Key, invention licensing guru and author of “One Simple Idea,” made an introduction when I mentioned to him that I was working on a book about female inventors. I discovered another personal hygiene product with a catchy name that speaks for itself: Squatty Potty—a stepstool-like device that, according to the website, puts you in a better squatting position to provide “the new healthy way of eliminating.”

I sat down (forgive the pun) with Judy Edwards, who invented the product with the help of her husband, Bill, and son Bobby.

Edith G. Tolchin: Did you, Judy, create the prototype, or did you and your family work on it together?

Judy Edwards: Squatty Potty, like most new inventions, was discovered out of need. After hearing about the squatting concept and knowing that Squatty Potty was literally a product for everyone, we knew that we needed to bring it to market even if it was a product that no one really wanted to talk about.

I had been using a regular stool that I had around the house and hated it in my bathroom. It was not the right size or height, and it was always in the way. So one day while talking about it at the kitchen table with my husband, Bill, and son Bobby, we decided to make a stool that would be designed for the task. Together we drew out some drawings that we thought would work. Then we went to a neighbor and asked him to make a

prototype out of wood. We had several made before we came up with the perfect design that we thought would work. And of course we had to come up with a name, get some design patents and trademarks. It was a lot of work at the beginning. We had never marketed a product before so were unsure how to go about it.

EGT: What was the product timeline?

JE: Squatty Potty was started at the end of 2010, when we sent prototypes to family and friends for Christmas. We didn’t formally start the business until 2011, when our first website was created. Because Squatty Potty really works for so many people, right from the beginning we started getting more orders from the gifts that were given out that first Christmas. Then from there we started sending free stools to health bloggers for review. With rave reviews, the orders started coming in.

EGT: Did you have any problems with your first prototypes?

JE: Yes, we changed the design several times before we came up with a stool that we felt would work well for most people. Then we found out really quickly that regular painted wood would not be the best product for a bathroom stool. That’s when we decided to find an injection mold company that could build a stool close to the wood model. This cut our customer cost to less than half that of the wood model, and it also gave us bigger margins for retail sales in the future. In order for any product to make it in retail, it needs to be around 4-5 times the cost of manufacturing.

EGT: Are you manufacturing in the United States, or overseas?

The Squatty Potty Ecco Toilet Stool is highly effective in aligning the colon for effortless elimination.

PHOTOS COURTESY OF SQUATTY POTTY

JE: We started by having them built in China but soon found out that would not work for us. We wanted to have more control and be able to store inventory, so we decided to have the molds shipped to the United States to a factory close to our office in Utah. After shipping the molds it was actually cheaper for us to have them produced here. We are happy that it was probably one of the better decisions we made along the way. We do, however, realize that sometimes it is not always the best—as with our bamboo stool. We still have it made in China, where bamboo is harvested.

EGT: Please share your “Shark Tank” experience with us.

JE: “Shark Tank”—Season 6, which aired in November 2014—was one of the scariest things I have ever done. Going in the tank knowing how they can slaughter people was so intimidating. I was not sure if they would think we even had a real product and would believe us.

They do not know ahead who is walking into the tank, so the surprise for both is very real. Even though it was very difficult for me, it was probably one of the most important business decisions we have made. Twenty-five million instant audience viewers is literally

worth several million dollars of advertisement for a company like ours that has a product that needs education for the consumer. It was such a great break for us.

EGT: What other products are you offering at your website? What are your means of selling?

JE: We realized that building a brand is very important in a business. So part of that is branching out into products that complement your anchor product. We currently offer several models of Squatty Potty along with a toilet spray called “Unicorn Gold,” a takeoff of our popular unicorn video for Squatty Potty. We offer a bidet that fits to your existing toilet. We also offer a product called “Good Move,” which is a natural laxative for occasional constipation, and are hoping to come out this next year with a complete pharmacy line for better gut health.

We are introducing a new product called Squatty-pottymus. It is a complete potty training kit with seat, literature and stool for children learning to potty train. It helps teach parents the importance of proper toilet posture from the beginning.

We are currently selling products to many retail stores—some of which are Bed Bath & Beyond, Target,

“Knowing that Squatty Potty was literally a product for everyone, we knew that we needed to bring it to market even if it was a product that no one really wanted to talk about.” —JUDY EDWARDS



Judy Edwards (second from left) and Bobby Edwards are flanked by Lori Greiner of “Shark Tank” and Dr. Mehmet Oz during their appearance on the “Dr. Oz Show.” Greiner talked to Dr. Oz about the invention after seeing it on her show.



Squatty Potty says its new Slim Teak design “speaks to your urban sensibilities.”

and Costco—and are hoping to get into many pharmacies next year. However, our biggest retailer is Amazon.

Our total sales reached close to \$30 million in 2016.

EGT: How many models of Squatty Potty are there?

JE: We currently have around seven or eight models.

EGT: Did you make any attempts at crowdfunding?

JE: In the very beginning we tried crowdfunding, but it didn’t prove successful for us. Basically, we had to discover a way to help people talk about this (often controversial) subject. With our video that has had over 130 million views, I think now that this subject of pooping isn’t as difficult to talk about. We tried to make it a more approachable subject.

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

JE: At first we just did all design work in house. It has been probably one of the hardest obstacles to hurdle over and continues to be a challenge, but as the company has grown and our budget is bigger we have reached out to a professional company that is currently changing our branding and making everything more uniform.



Unicorn Gold, a toilet spray made by the company, is a takeoff on its popular unicorn video.



EGT: Which obstacles have you encountered?

JE: Oh, my; there have been too many obstacles to mention. But one thing you have to remember is to try to educate yourself as much as possible and don’t be afraid to admit that you don’t know it all. Always be open to suggestions from others that have been through (the process) before. Stay focused, and know that many discouraging days are ahead. But the rewards will come with hard work and effort.

Don’t be afraid of failure. We have had several designs that just didn’t work or sell well. Always listen to your customers as they will give you advice on what can be improved. 🍷

Details: squattypotty.com

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





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A Kind of Kids' FitBit for Words? Talk to Me

WORD-COUNTING STARLING A LEARNING AID DURING BRAIN'S CRUCIAL FIRST FEW YEARS **BY JEREMY LOSAW**

Once three inventors verified the importance of maintaining a daily dialogue with children from the earliest age up to kindergarten, it was elementary for them to conceive a product to do just that.

The VersaMe Starling was born from a graduate student project at Stanford University, where brothers Jon and Chris Boggiano met their future co-founder Nicki Boyd and decided to conduct research on how technology can help improve educational outcomes. They started by focusing on adults with limited economic mobility and tried to find the causes.

Disparities in K-12 education was thought to be the smoking gun, but further research led them to find that there was already an educational disparity among children at the start of kindergarten. After all, birth to age 3 is the fastest period of brain development in a person's lifetime. Studies show that the number of words a child hears up to age 4 is strongly correlated to how early he or she can talk and read, which often leads to stronger academic performance and even better success in the workplace.

Chris Boggiano read an article in *The Economist* about the importance of parent-child interaction in early life—how the more

caregivers talk to a child, the better the learning outcomes. “I am in the middle of Silicon Valley. Wearable technology is everywhere. Wouldn't it be cool if you could have a wearable that counts the words?” he recalls.

The three started VersaMe (“talk to me”) to bring child education products to market, with their flagship a word-counting device for children called the Starling.

The wearable, star-shaped device counts the amount of words a child hears during the day. It includes a soft touch clip that can be slid over the collar of a child's shirt or onto the clothing of the parent. The device connects to the parent's smartphone via a Bluetooth connection; the Starling app reports back the word count from the device. The water-resistant system, made from medical-grade plastic, works in all languages. The kit comes with a charging dock and is available for \$149.99 at versame.com.

Early plans, challenges

The three began prototyping in earnest after nearly a year of research. The first prototype used an off-the-shelf Bluetooth Low Energy microphone that was disassembled and mounted inside the cap of a Sharpie marker. It connected to an iPhone and used a speech processing platform called OpenEars to record the words. The first prototype, tested on Chris's 2-month-old daughter, allowed the team to prototype the experience of using the system.

Early testing went well, and the team graduated to more bespoke (custom-made) circuit design and 3D-printed versions of the device. The three kept a keen eye on their budget. “We had some local 3D printer guy I met in the Target parking lot,” Chris recalls. “I sent him CAD drawings and he would hand me a Ziploc bag full of 3D-printed shells.”

Voice processing was one of the biggest development hurdles for the Starling. Earlier, most development for voice processing focused on accuracy. Because it is a fairly computing-intensive process to decode voice data, most programs—such as Siri and Google Voice—push audio data to the cloud for processing. However,

The Starling counts the number of words a child hears during the day.





Studies show that the number of words a child hears up to age 4 is strongly correlated to how early he or she can talk and read, which often leads to stronger academic performance and even better success in the workplace.

the Starling application focused on volume of words, not the translation.

"I don't really care if I say 'apple' and it hears 'orange.' I just want to know if a word happened," Chris says.

There was also a privacy and social component to consider. Recording audio files and pushing them to the cloud would potentially provide a huge database of recordings from inside the homes of thousands of families, which could lead to privacy and consent issues. All of these factors led them toward processing raw word count on the device without transmitting audio data to the phone. Ironically, this allowed them to deploy lower-tech solutions but ones that were compact and computing lean.

The three had patents filed about 6 months into development. They wanted to have most of the core technical details worked out before investing time and money in intellectual property. A start-up could have trouble fighting an IP battle if a bigger firm treads on its patents, but Chris wanted to protect the work and ensure he had the innovation covered.

The team continued its design and engineering work on the product to get it ready for launch, working with a company to create the star-shaped design. It took many iterations to finalize the design, but in the end the aspirational star shape fit the feel of the product. The team also spent a lot of time refining clips. Children younger than 4 are mobile and unpredictable, so it took much refinement to get a clip that was kid friendly and durable.

Crowdfunding vindication

The Starling crowdfunding campaign launched on Indiegogo in late 2015 raised \$100,721 on a \$30,000 goal

and had more than 500 backers, proving to the team that its product resonated with parents and parents-to-be. In anticipation of the campaign, the company cofounders started working on manufacturing development. The design firm they worked with had done other kids' products and understood the standards and regulations associated with bringing them to market. The firm also had factory contacts in China that already had experience in the industry, so it was a no-brainer to manufacture overseas. Because of the head start with manufacturing, the company was able to deliver product just a few months after the campaign ended.

Starling has become a hit with parents in its approximately one year on the market. Parenting website Thebump.com gave Starling a 2016 innovation award, and versame.com boasts more than 30,000 subscribers to its site.

The company realizes that the Starling's price may keep low-income families from taking advantage of the technology, which has led to work with social outreach groups such as Literacy Lab to help get the product to as many parents as possible. The team is also working on updated software to be released later this year and has started planning the Generation 2 Starling. 📍

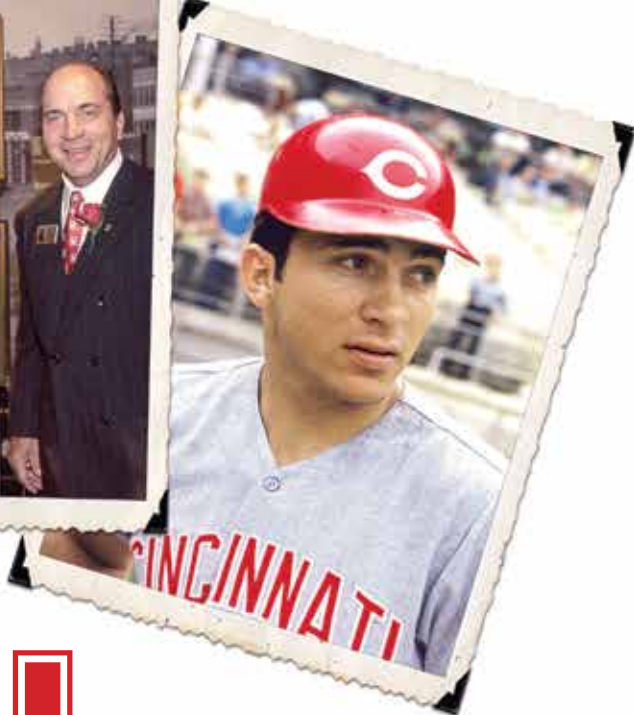
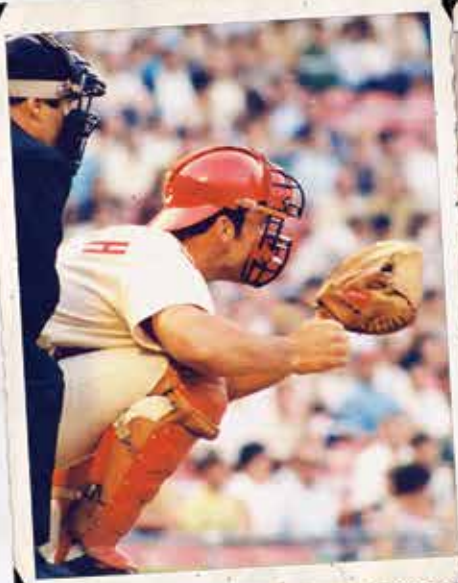
Details: versame.com

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



Jon Boggiano (left), Chris Boggiano and Nicki Boyd cofounded VersaMe in order to bring child education products to market.





SAFE!

BY REID CREAGER

JOHNNY BENCH FIGHTS BULLYING WITH MOBILE APP FOR SCHOOLS

To baseball fans, Johnny Bench epitomizes toughness: 11 broken bones and three major operations during a Hall of Fame major-league career that spanned 1,744 games at catcher, the game's most grueling position.

Oh, and throw in an estimated 24,000 squats a year; being hit countless times by foul tips from pitches approaching 100 mph, as well as by runners in home plate collisions; playing virtually the entire 1975 season with a shoulder injury that resulted in cartilage and part of his collarbone being removed; a dramatic ninth-inning home run in a 1972 playoff game while secretly playing with a growth on his lung that required off-season surgery.

It's assumed that bullies leave tough guys alone. But as an eighth-grader growing up in Binger, Oklahoma, Bench was a target for this different kind of pain that can be every bit as lasting.

"There were these two kids, always bullying people," he says. "I'll never forget them. One was always pushing people. One day he pushed too much and I busted the kid in the mouth. I got in trouble for it, but I wasn't heckled so much after that."

Bench knows that wasn't an ideal response. It may be even less of a viable option now—in a time when some schools have problems with armed students, a time when so many people are quick to sue. But since bullying wasn't seen as a major problem then, fewer solutions were available.

All-purpose notifications

Now there are more ways to stand up to bullies. As the father of school-age boys age 7 and 11, the long-time Cincinnati Reds star is alarmed by the short- and long-term effects that bullying can have on children's sense of safety and their ability to grow up confident and productive. So his new company, *moblWorks*, has unveiled a mobile app for schools to fight the problem.

The *Smithfield School App* (Smithfieldschoolapp.com)—so-called because it is sponsored by Virginia-based *Smithfield Foods*—helps students feel more in control of their safety. Available for free to K-12 schools in the United States (except for a \$79 monthly hosting fee), the app lets teachers and administrators notify parents of reports of bullying, cyberbullying, threats, school closings and other alerts. It works

A legendary 17-year major-league career with the Cincinnati Reds resulted in Johnny Bench's induction into the Baseball Hall of Fame as well as the Reds Hall of Fame, where he is shown with his oldest son, Bobby.

with smartphones and all pads, and schools can choose what they want students to report.

Using a feature called Incident Reporting, students begin the information process by reporting bullying, crimes, threats, weapons and other problems so that school officials can take appropriate action.

"The app started out with bullying in mind but expanded to where you can get these alerts and text notifications about bringing people up-to-date on things," Bench says. "If there's a threat and parents are standing outside and the school's on lockdown, how do you communicate? It's just the idea that some young people can at least put out that some of these bad things are happening."

Users can get information related to weather, facility problems and accidents so that schools can relay the information to parents, faculty and students. There is also information about the school, such as academics, clubs, sports, music and schedules.

The copyrighted app is "a great opportunity to reach out to these kids and make them feel safer," Bench says. "It's just an invaluable app in so many ways because it just keeps you up-to-date with what's happening in your school, kind of a safety valve for all of us."

Learning with a son

As Bench's son Justin recently neared the end of fifth grade, he was working on a book report for "Blackbird Fly" by Erin Entrada Kelly. Before long, Bench was

consumed by the saga of Apple Yengko, the only Filipino-American girl in her small Louisiana school.

"So I'm reading along with him, and it's all about kids and bullying and belittling people, how she is an outcast and ostracized by mean-spirited kids looking for popularity, so they band together and make fun of other kids. They put Apple on the 'Dog Log,' the boys' list of the ugliest girls.

"In the book, there was nobody there for her. There was no sounding board, no people listening. Kids had no one to talk to. They just had to suffer.

"Some kids don't even want to go to school because of bullying. I've been involved with the National Guard Youth Foundation, where I know that 25 percent of our kids drop out of school because first they fail, but a lot of it has to do with them getting bullied. They have nobody listening to them. They cannot talk to anybody."

In the book, the fictitious main character takes up the guitar and eventually finds comfort in who she is. Her musical ability helps her gain acceptance, but her main victory is in her acceptance of herself.

Bench is pleased to see what his sons have learned about bullying. "You have an association right then and there that your boy is starting to learn that this is mean, and that people suffer from hearing these things. I learned when I was a young boy that there are always greater and lesser people than all of us."

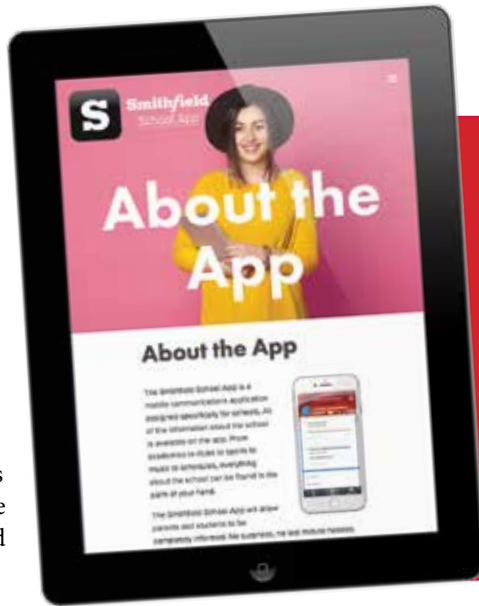
He reminds that bullying isn't just a fear and safety issue. It pounds away at confidence and prevents young people from reaching their potential.

"It's just an invaluable app in so many ways because it just keeps you up-to-date with what's happening in your school, kind of a safety valve for all of us." —JOHNNY BENCH

A 1965 class valedictorian at Binger-Oney High School in Binger, Oklahoma, Johnny Bench says that bullying can prevent young people from reaching their potential.



"Pretty soon, you don't want to try out for the play. You don't want to try out for the team because they tell you you're not as good as they are and they'll make fun of you—and now with social media, the cyberbullying makes the situation worse. All some of these kids need is just to have the confidence to walk down the hall and not be bothered."



5 FACTS ABOUT THE SMITHFIELD SCHOOL APP

- Free to K-12 schools in the United States, except for a \$79 monthly hosting fee
- Works with smartphones and all pads
- Reporting by students is anonymous, and schools can choose what they want reported
- Can provide information related to weather, facility problems and accidents
- Provides school information such as academics, clubs, sports, music and schedules

Promising signs

Bench's company announced the launch of the app in November. He looks forward to having new momentum at the start of a school year for the first time.

"We're still counting the numbers on how many schools have been using it," he says, adding that the app is off to a slow start. He theorizes part of the problem may be that even though schools can choose what they want students to report, some schools are leery of consequences if someone feels they haven't responded to notifications from students. "But everything's ready to roll now."

He has seen many signs of the app's promise: "One school had over 2,000 downloads of the app by the alumni, teachers and parents. The reason is that this app is so much more (than about bullying) because it now alerts you to any problems in the school."

"Let's say you're anywhere north, and all of a sudden there's a snowstorm. You just send out a text and everybody gets notified that school will open at 10 o'clock, or school will be released early. Or maybe the football game has been postponed tonight."

Bench says the school is responsible for writing the text for the apps. Because the system is set up that the original notification is anonymous, there is a chance the app can be used the wrong way—"but from the back end, we can actually go in and find out where that is coming from. So there is that protection as well."

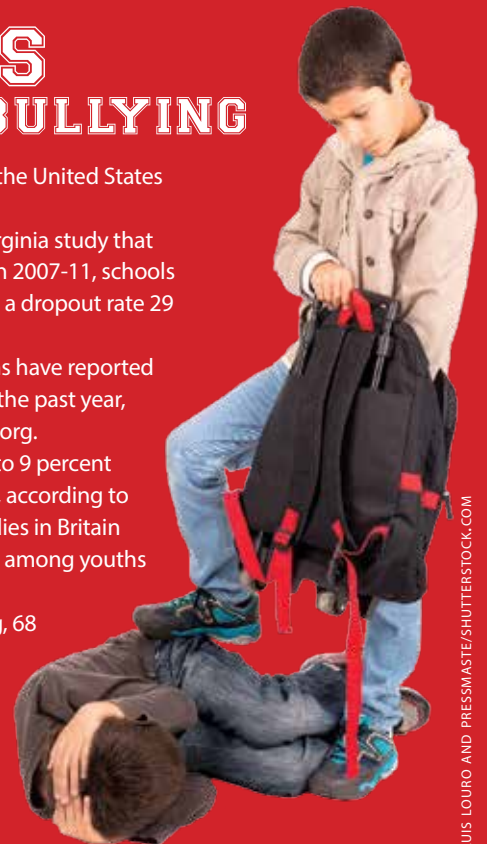
In the end, the Smithfield School App is all about protection for everybody: students; parents who want their kids protected physically and emotionally; schools seeking to maximize the best learning environment. "It's very much about peace of mind," Bench says, "but it's also about just doing the right thing."

"So with this, let the faculty and the head of the school know what's going on and say, 'Stop this. Stop this right now.'" 📱



5 FACTS ABOUT BULLYING

- About 1 in 4 kids in schools in the United States are bullied on a regular basis.
- According to a University of Virginia study that tracked high school students in 2007-11, schools with high rates of bullying had a dropout rate 29 percent above average.
- About 90 percent of LGBT teens have reported being bullied at school within the past year, according to BullyingStatistics.org.
- Bullying victims are 7 percent to 9 percent more likely to consider suicide, according to a study by Yale University. Studies in Britain have found half of the suicides among youths are related to bullying.
- According to dosomething.org, 68 percent of teens agree that cyberbullying is a serious problem, and only 1 in 10 victims will tell a parent or trusted adult of their abuse.



HER GOAL: END CHILDREN'S HOT CAR DEATHS

AS A TEEN, ALISSA CHAVEZ DEVELOPED
A MOBILE APP THAT CAN SAVE LIVES BY DON DEBELAK



©GARGANTOPIA/SHUTTERSTOCK.COM

Alissa Chavez was only 14, but she knew that 40 was 40 too many.

That is approximately the average number of deaths per year caused by children accidentally being left in hot cars by their caregivers. Alissa had heard the horrifying stories. The fact that she often helped at the day care run by her mother, Anna Chavez, in Albuquerque, New Mexico, added to her concern for the children.

When Albuquerque Christian Academy held its science fair, Alissa invented a device that can help limit these tragedies. She purchased a door sensor at Radio Shack, put a Bluetooth chip in a key fob and set the fob to sound an alert when it went out of range of the door sensor (about 15 feet) as it was engaged by a child's weight.

She won first prize at the science fair and heard so many encouraging remarks that she decided to sell her invention, the Hot Seat, through her business Assila LLC ("Alissa" spelled backwards). But she felt she needed to retool her concept.

"I didn't want to continue with the key fob, because it was bulky," she says. "I wanted to switch to a cell phone alarm because everyone has cell phones."

Currently, Hot Seat—which sells for \$79.99 and can be used in any infant, toddler or booster seat—has two components: a sensor pad that can be placed in any car seat and an app available for iPhones. The sensor pad connects via Bluetooth directly to the caregiver's Hot Seat app on his or her iPhone.

You can also connect multiple Hot Seat sensor pads. If the pad senses that a child is in the car seat and the cell phone is at least 20 feet away from the vehicle, an alarm on the iPhone will sound.

Now 20, Chavez's design success has garnered national coverage with TV appearances on "Today," two visits to Ryan Seacrest's radio show and a host of other appearances. She was honored by Albuquerque Mayor

Richard J. Berry and received awards from Glamour magazine, New Mexico Women in Technology and the entrepreneur site Design Good. The design had 500 preorders waiting for delivery in late June or July.

Baby steps and bigger ones

Those are the basics of Chavez's success story. But as is typical in the invention process, success did not come easily and involved several important steps.

First, she had to get estimates to determine how much money would be needed for patents, engineering work, prototypes and the initial production process. She had some resources to draw upon for raising money but also had a crowdfunding campaign on Indiegogo. Her goal was a modest \$5,000 because she was "skeptical of the process," so she did not run a rewards-based campaign in which people are promised a finished product for their contribution. Campaigns that utilize rewards typically draw more money.

Still, she raised \$20,000. To this day, she is "amazed by the generosity of people that I have never met that made my campaign a success."

Because safety guidelines for any product involving children have become increasingly stringent, Chavez had to ensure she had all necessary approvals. In her case, this was Consumer Product Safety Commission certification. These tests have to be run by outside agencies, which you can find with a Google search.

She had to determine exactly what she needed in a design company: "I knew I wanted a firm that did both software and hardware design."

But selecting a vendor was the most frustrating part of the project for her. "I wanted a firm that would work with me," she says. "I was only 15 at the time, and most companies would not take me seriously." Chavez decided on Albuquerque Software and inCaffeine Development Studios, which had

hardware and software design and was eager to work with her. She also selected two Albuquerque firms for manufacturing.

A good working relationship with a design company is virtually essential because there will inevitably be many changes in the design process—"about a million," Chavez says.

Prototypes and beyond

Chavez built five prototypes to work out all of the design bugs. This is not unusual and is, in fact, recommended; it is advised to get a bid for a minimum of three prototype variations in order to keep costs under control.

In terms of building organic consumer demand, she got a big break when she received her humanitarian award from Albuquerque's mayor in 2014. That publicity was picked up by TV talk shows and resulted in strong publicity that went national.

Although not everyone is that fortunate, Chavez realized that she could also help draw attention to her invention by getting her story on blogs, Facebook group sites, and other spots where her target customers might go. A social media campaign is a must for

getting followers; Chavez uses Facebook (where she has a store), Instagram and Twitter, as well as having her own website.

In order to sell the Hot Seat, she needed to be listed in the Apple store on the iPhone. She and her software developer worked to perfect the app and submit it to the Apple App Store for approval, and the Hot Seat was approved in a few days. Once her android product is ready, Chavez will have to apply to be placed into the Google Play store as well.

Both the Apple store and Google Play store have easy application processes. You can find the specific procedures required through a general search. The stores do check out apps to be sure they don't cause technical problems, but that seems to be their only criteria.

Wisely, Chavez is investigating all viable distribution channels. She is planning on selling to Amazon as soon as her product is available and is contacting young child-related web stores and buyers at brick-and-mortar children stores, as well as major retailers. This is a continuation of the remarkable big-picture vision and planning that began for her as a 14-year-old. 📱

Details: babyhotseat.com

Hot Seat has a sensor pad that can be placed in any car seat and an app available for iPhones. The sensor pad connects via Bluetooth directly to the caregiver's Hot Seat app on his or her iPhone.



Switching to a cell phone alarm was a key improvement in Alissa Chavez's invention.





PHOTO COURTESY OF GULLIVER SCHOOLS

From left: Miami, Florida-area classmates Carolina Baigorri, Susana Cappello and Victoria Roca overcame the discouragement of a failed initial plan and problems pitching their product to others.



MAKING WOMEN'S SAFETY THEIR BUSINESS

3 TEENAGERS LAUNCH SMART STRAW, WHICH DETECTS COMMON RAPE DRUGS **BY REID CREAGER**

Susana Cappello says her father always told her the best inventions are the ones that help people. Now she and two teenage classmates who have family histories of entrepreneurship are helping others while helping their long-term aspirations.

The three Miami, Florida-area students have developed an innovation that has garnered national attention: a straw that detects common date-rape drugs such as GHB and ketamine—both odorless and colorless—in drinks. The patent-pending “Smart Straw” has two chemical test strips that turn navy blue when they come in contact with those substances.

Susana, Victoria Roca and Carolina Baigorri were among few females in their entrepreneurship class at Gulliver Preparatory School in Pinecrest, Florida. So when asked to create a product and business plan as part of a project during the past school year, they had extra motivation to succeed. But as is almost always the case with an invention idea, there were early struggles.

Original plan scrapped

Their first idea was a jewelry pendant that could be dipped into a drink. When chemistry and bio medical department officials at the school said that would be too hard to execute, “we were discouraged,” Susana says. “We had already done research that showed GHB and ketamine are the most common club drugs; we had a main demographic of college-age students.”

Susana also had some real-life indicators of date rape, via communications her parents received at home. “My sister goes to Northwestern University. My parents almost every month will receive an email about rape cases that happen on or off campus, typically with involvement of drugs and alcohol.

“That definitely would make me a little worried for my sister and her safety. ... Just having my parents explaining the whole situation about drinks at social scenes was a motivator.”

During the girls’ many get-togethers at school, it was

“My parents almost every month will receive an email about rape cases that happen on or off campus, typically with involvement of drugs and alcohol.” —SUSANA CAPPELLO

common for them to drink from their water bottles with straws. Using straws to determine the presence of date rape chemicals would be a more practical solution, so they switched to that.

There was little question they had a useful and potentially impactful innovation. In a survey the three conducted at Northwestern, half of the respondents said they knew someone who had been drugged and 85 percent said they would use the straw.

Tasked with pitching their concept to the class, they struggled. But they remained confident in their idea and watched online videos to hone their presentation skills, and entered the Miami Herald's Business Plan Challenge High School Track.

Smart Straw won the competition. Publicity in the Herald and other Miami-area media outlets spawned national recognition via major news outlets. A video went viral and got media attention through Facebook. “It just exploded,” Susana says.

Equipped for the challenge

The last six months have been a whirlwind of media appearances and planning. One of the most important steps has been finding a manufacturer to execute the science of how the straws are to work; the Smart Straw team is close to revealing that company. Among other considerations in talks with the manufacturer are making an affordable and environmentally friendly product that bars, college organizations and students can easily carry or distribute.

Asked to identify the most challenging aspect of the experience, Susana says it has been “obtaining a patent, because it’s such a long process—also, making sure not to infringe on anyone else’s patent.” (There have been earlier variations of the straw concept, but none have gone into production.) She says the product is trademarked, and the company is working with IP lawyers to get more protection.

All three of the students and their families are familiar with this notion, if not the process itself. Susana’s father, Juan Pablo Cappello, is a prolific entrepreneur and investor who was one of the founding investors for The LAB Miami, a hub for entrepreneurs where she has worked. In 2015, Susana cofounded a business called Sketch Your Home. Customers upload a picture of their home, and within 48 hours they are sent three

SAFETY INNOVATION AROUND THE WORLD

LifeStraw

More than 840,000 people die each year from water-related disease—and every minute, a child dies of a water-related disease, says dosomething.org. This crisis is especially prevalent in developing and impoverished countries.

A water filter that lets you safely sip straight from a stream or lake without any pumping, squeezing or filling, LifeStraw (lifestraw.com) physically removes 99.9999 percent of all bacteria, such as salmonella, cholera and E.coli; and removes 99.9 percent of all protozoa, such as giardia and cryptosporidium. Because LifeStraw weighs only 2 oz., it features easy transport.

The company plans three new products for fall release: LifeStraw Flex, which can be adapted into many configurations to provide ultimate versatility; LifeStraw Play, a 10 oz. water bottle with an integrated filter designed for kids that provides safe drinking water anywhere; and LifeStraw Universal, an adapter kit that lets you turn a water bottle into an instant water filter. The kit includes caps that are compatible with the most popular bottle brands.



LifeStraw plans three related additions.

The Drinkable Book

OK, the book itself is not drinkable. But it’s a dual-purpose clean-water aid: an instruction manual on the hows and whys of clean drinking water, with pages that can be used as water filters.

Introduced by WATERisLIFE (waterislife.com), the book comes packaged in a 3D-printed box that converts into a filtration tray. When you tear out one of the pages and slip it into the tray, you can use it to filter water. Each filter can be used to safely treat about 100 liters (about 26.5 gallons) of water—up to four years’ worth, depending on usage.

Each page is injected with silver nanoparticles, giving the paper its orange coloring. As the water runs through, the silver ions kill more than 99.9 percent of bacteria that cause diseases such as cholera, E.coli and typhoid.

(Continued on page 28)

The Drinkable Book has multiple clean-water uses.



The Orange-Fleshed Sweet Potato

Impoverished countries that struggle to provide enough vitamin A for their people can now grow their own orange-fleshed sweet potatoes, thanks to a program led by plant scientists at the International Potato Center (cipotato.org) and HarvestPlus (harvestplus.org).

By cross-breeding locally grown sweet potatoes with versions rich in vitamin A—a process known as biofortification—potato crops naturally get better at addressing the deficiency. Plant scientists have also bred them to be more resistant to droughts and viruses. The orange-fleshed sweet potato was introduced in 2007 to 24,000 farming families in Mozambique and Uganda.

According to *Time* magazine, which listed the sweet potato process among its best inventions of 2016, a vitamin A deficiency in sub-Saharan Africa afflicts more than 43 million children younger than 6 and leaves them vulnerable to blindness, malaria, infection and other afflictions.

Kite Patch

A mosquito bite is more than an itchy annoyance. It is often associated with world scourges such as malaria, Dengue fever and West Nile virus. Although malaria was eliminated from the United States in the early 1950s, the World Health Organization estimates that in 2015 malaria caused 212 million clinical episodes and 429,000 deaths in other countries.

KitePatch—a sticker that emits chemical compounds, blocking a mosquito's ability to sense humans—is being developed as a lightweight, durable complement to Kite Shield mosquito repellent. A report last November said the patch would be available in the first quarter of 2017, but the latest from kitepatch.com says it is still in development.

The project, developed in California by Olfactor Laboratories, was co-funded by the Bill and Melinda Gates Foundation. It raised more than a half-million dollars on Indiegogo.



Fighting world scourges.



Vitamin A production gets a boost.

draft images/sketches of the home—each in a different artistic style and fine-tuned using artificial intelligence and graphic design tools.

Carolina Baigorri will join Susana as a senior this fall; they are members of Gulliver's International Business and Entrepreneurship Program. She watched with interest as her aunt and uncle, Ed and Crissi Boland, launched their HeroBoys toy line in the past year.

Victoria Roca has been accepted into Babson College, a private business school in Wellesley, Massachusetts, where she will take her first university course on entrepreneurship this fall. Her grandfather founded Digitel in Venezuela, and her mother is also an entrepreneur.

What's next

While the business aspects of the Smart Straw are ironed out, the team is brainstorming on ways to improve the product, such as various straw sizes to fit different kinds of drinks. "A glass of Coke may need a longer straw compared to a mojito," Carolina told "Inside Edition."

"We do have some other ideas," Susana says, "but our plans are to stick to one idea at a time for now, bringing

From left: Victoria Roca, Carolina Baigorri and Susana Cappello display congratulations they received from the United States Senate for winning the Business Plan Challenge, which put Smart Straw in the media spotlight.



one idea to market at a time. We're currently just putting our business ideas on paper."

The next big public milepost for Smart Straw will be a Kickstarter campaign, scheduled for an August launch. The three are excited about the products prospects, though they caution it will not be a panacea.

"We know it's not a solution, because it can't end rape," Carolina told "Inside Edition." "But we were hoping to lower the amount of rape and dangerous situations you might be in through drugs." 🍷

DATE RAPE FACTS

- A 2016 study by the Bureau of Justice Statistics found that 21 percent of undergraduate women from nine schools experienced sexual assault since entering college, and most incidents involve the consumption of alcohol and drugs.
- According to RAINN (Rape, Abuse, and Incest National Network), women ages 18 to 24 are at an elevated risk of sexual violence.
- The Office on Women's Health says that the most common date rape drugs include gamma hydroxybutyric (GHB), ketamine and Rohypnol.



PHOTO COURTESY OF GULLIVER SCHOOLS

HELMET SAFETY, UPDATED AND NEW

Last August's *Inventors Digest* cover story tackled a growing issue that may be the most important in sports: helmet safety. Former NFL punter Zoltan Mesko, the cover subject and cofounder of Impact Labs, detailed his company's quest to develop products that target head trauma and reduce the number of concussions.

Benjamin Rizzo, a partner with Mesko, provided us this update in July: "Impact Labs has re-branded to Exero Labs and is building our next-generation prototype based on lab data from testing at Virginia Tech's impact pendulum earlier this year.

"We are focused on reducing the possibility of finger entrapment and all impact forces, especially rotational acceleration. We have two semi-pro teams signed up for pilot trials later this year and are looking forward to getting out of the lab and onto the field."



Morpher

Safety and convenience are the hallmarks of this helmet, which folds flat. Morpherhelmet.com says it is as safe as an old-style helmet and has "passed all relevant safety criteria for most of the world."

The company's stated hope is that the added convenience will make people more likely to use the helmet. It says that a lack of portability is the reason given for 82 percent of riders who don't wear a helmet.

Morpher won a *Popular Science* Safety Innovation of the Year award, as well as making *Time* magazine's list of the top 25 inventions of 2016.



The helmet folds flat.

Hövding

Billed as the world's first airbag bicycle helmet, Hövding (Hövding.com) is calibrated to deploy, inflate around the head as a hood, and provide maximum shock absorption upon impact. The nylon fabric of the airbags has been tested for sturdiness and proven not to rip if scraped along the ground or bike components in an accident.

The rider's field of vision remains open after deployment, even though the inflated airbag surrounds his or her entire head. Research and statistical analysis established algorithms that help Hövding distinguish normal cycling bumps in the road—even running up and down stairs on foot—from bike accidents.

Each airbag also contains a black box that records accelerometer data 10 seconds before deployment. The information can be used by Hövding developers to improve the product.



An airbag inflates around the head on impact.

THE MOST IMPORTANT SAFETY INVENTION EVER?

Penicillin? The first polio vaccine? There is no definitive answer. But one invention that would be high on anyone's list—and the first image seen when Googling “best safety inventions”—is the seat belt, which has affected virtually every person in America countless times.

As for who invented the first seat belt, that depends on which source you believe and which kind of seat belt you're talking about: either the classic two-point lap belt used in planes and old cars, or the modern three-point belt that spreads out the energy of the moving body over the chest, pelvis and shoulders upon impact.

Some sources (including theinventors.org) report Volvo invented the first seat belt in 1849. Many other sources claim Sir George Cayley invented the first seat belt, for use in planes, in the 1800s. Everyone seems to agree that Edward J. Claghorn of New York was granted the first patent for a safety belt on Feb. 10, 1885—though contrary to widespread reports, his application had nothing to do with an automobile.

The two-point distinction is a point of confusion.

Some sources say that the two-point belt, which attaches at its two endpoints, was

invented in the early 1900s by Jack Swearingen of Louisville, Kentucky. But isn't that the same kind of early-stage belt frequently attributed to Volvo and Sir George Cayley in the 1800s?

There seems to be more clarity when it comes to the inventor of the three-point belt. That was Nils Bohlin, an engineer at Volvo, who filed his patent in 1959. According to Roadandtrack.com, Americans Roger Griswold and Hugh DeHaven laid the groundwork for Bohlin's three-point belt four years earlier, when they filed for a patent for the CIR-Griswold restraint. Like Bohlin's belt, it had both a diagonal and pair of lap belts, but all three belts met in the middle.

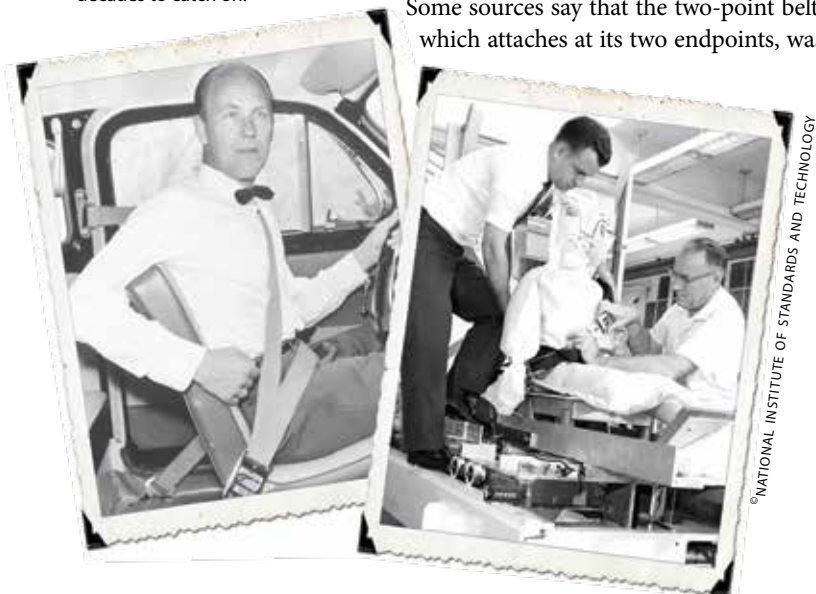
Older Americans may recall that it took decades for the car seat belt to latch on as a ubiquitous and mandated safety device. An Esurance blog, “The Hotly Contested History of the Seat Belt,” notes that seat belts did not become present in all American-manufactured cars until the late 1960s or 1970 amid disagreement over how much safety the belts provided. Some worried that people whose cars caught on fire or went underwater would not be able to escape; some felt it was safer to be thrown clear of the vehicle in an accident; others said wearing the belt provided a false sense of invincibility and encouraged drivers to take more risks.

In 1970, a Federal Motor Vehicle Safety Standard proposed that all U.S. vehicles made after Jan. 1, 1973, include a restraint system of air bags or automatic belts. The auto industry resisted—aware of the added production costs that would entail—and the issue languished for a decade. As late as 1981, the Centers for Disease Control and Prevention reported that only 11 percent of Americans were using their seat belts.

In 1983, State Farm Insurance Co. took the National Highway Traffic Safety Administration to court in an effort to make passive restraint systems standard, and won. Six years later, 16 states still had not established seat belt use laws. New Hampshire still does not require adults to wear seat belts. 🚗

Nils Bohlin (below left) filed his patent for a three-point belt in 1959.

Despite extensive early testing of seat belts, they took decades to catch on.



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Consider 'Indirect Buyers' for Your Invention

LICENSING IS AN IMPORTANT WAY TO ADDRESS FUNDING ISSUES, BUSINESS RISKS **BY JOHN G. RAU**

Clifford Cohen, the noted author, is quoted as saying: "If you think you've invented something, ask yourself three questions: Has it been done before? Why hasn't it been done before? Is it worth doing? If your invention passes these three tests, you're good to go."

But if you have a patented or likely-to-be-patented product, the real question is: "Who would buy it, and why?" Consumers with specific product needs will buy it only if it solves a significant problem of interest to them and they can't find a better solution; if your proposed solution is relatively inexpensive and priced right; and if it makes them happy enough to tell others.

One way to get your new product into the hands of these consumers is to manufacture and sell your patented product yourself. Although this alternative has profit potential, it is very capital intensive: You will need significant financial resources to set up, start and operate your company. Most inventors don't have access to the required funds or have the business know-how to set up and operate a major manufacturing operation.

Licensing considerations

Recognize that you could have "indirect buyers" who would introduce your product into the marketplace themselves based on an agreement with you. Such buyers could include licensees and entities that would purchase your new patent outright.

A licensing agreement is attractive because the licensee assumes all business risks, from manufacturing to marketing and distributing the product. From a licensee's perspective, he or she would typically have an interest in licensing your new product for one or more of the following reasons:

- A possible significant revenue opportunity, making it worth whatever investments are required to get the product into the marketplace.
- It complements or fits well with one or more of the licensee's current product lines, allowing for expansion of his or her product offering.

- It may allow the licensee to become more competitive in the marketplace and perhaps create a stronger presence. He or she may insist on an exclusive agreement to get the best possible advantage.
- It may allow for access to additional confidential information about your new product and perhaps your special product-related know-how, possibly leading to future joint development efforts.

Licensing is not free. You will need capital to put together the story as to why someone would have an interest in licensing your new product. You may need to develop a working prototype and even conduct market research to build the case for where your new product fits in the marketplace, and document a demonstrated need.

Reasons to buy, sell patents

In the case of an entity that wants to buy your invention outright, you receive a lump sum of money for your patent and transfer ownership rights to the buyer. He or she receives the rights to any future income.

Here, timing of the sale could be an issue because the patent might be for a new technology or type of product that hasn't caught on yet. If, in the future, your new product becomes a successful "hot item" in the marketplace and generates much more for the new owner than what he or she paid for it, you sold too soon!

Nonetheless, there are several advantages to selling a patent, among these cited by Invents Company:

- For many people, the quick payoff is a motivating factor in their decision to sell, sometimes referred to as "take the money and run."
- Choosing to sell the patent outright at least guarantees some financial gain for all of the time and effort put into your invention and into the patent process.
- It eliminates the large investment that would be required to open a business to produce the new product.
- It's a simple process. You and the patent purchaser need to sign, or execute, the conveyance of rights, title, and



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When selling a patent, timing could be an issue because the patent might be for a new technology or type of product that hasn't caught on yet.

interest in the patent in the presence of a notary public. Then file the notarized conveyance with the United States Patent and Trademark Office within three months of its execution. One can use the USPTO's Electronic Patent Assignment System to do this.

On the other side of the transaction, someone would typically have an interest in purchasing a new product's patent for these reasons:

- In conjunction with other owned patents, it could be combined into an investment portfolio of existing patents so as to provide a marketable product, perhaps increasing the valuation of the company.
- Buying could take the new product off the street because it may compete with existing or under-development company products with similar functionality.
- A buy could keep competitors from introducing similar products into the marketplace, shutting out potential competitors.
- The buyer may have potential customers looking for new products like yours and could resell the patented product for a potential profit.

Encouraging examples

Buying patents can be big business, as illustrated in Joseph Hadzima's 2013 Forbes article entitled "How to Tell What Patents Are Worth." Kodak, the bankrupt company that invented the digital camera, sold its portfolio of 1,100 digital photography-related patents to a dozen licensees including Apple, Microsoft and Google

for \$525 million. Google bought Motorola Mobility, with its 17,000 patents, for \$12.5 billion, to protect its Android mobile operating systems from rivals. And Microsoft acquired 800 patents from AOL for more than \$1 billion, only to turn around and sell 70 percent of them to Facebook for \$550 million in cash.

Hadzima provided three basic steps companies must follow in deciding to purchase a patent. Companies must determine the quality of the underlying invention outlined in the patent; evaluate whether the patent is well constructed; and figure out how to extract value from the patent. You can expect any potential purchaser of your patent to conduct this form of due diligence.

You can find these potential "indirect buyers" at conventions and trade shows in your target industry. Another option are online databases that manufacture or distribute products like yours. You can buy space for a product announcement in trade magazines or in the USPTO Official Gazette to advertise that your patented product is for sale, or use a broker or web service to market your patent. 📧

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



Connecting to Learn About Connected Devices

MEETUPS PROVIDE VALUABLE INFORMATION ON THE RAMPAGING IOT MOVEMENT **BY JEREMY LOSAW**

The Internet of Things movement shows no sign of slowing down. Every time I go to the big-box stores, more shelf space is devoted to connected devices that are becoming a big part of our daily lives.

There is a corresponding groundswell of local, regional and national meet-ups and conferences about IoT. Industry pros gather to learn about the latest tools and techniques; novices and hackers gather to learn more about the capacity of connected technology and how to make their own prototypes.

Fortunately, Charlotte and North Carolina have a bustling IoT scene, and I was able to go to two events in the past month. I made some great connections and learned a lot from industry pros in my area.

RIoT 17

The first event I went to was RIoT 17, held at NASCAR headquarters in Charlotte. RIoT is a regional Internet of Things networking group based in Raleigh, North Carolina—the original “R” in RIoT—that hosts events to spread knowledge about all things IoT. I spent the day learning more about how IoT technology and big data are driving the fourth industrial revolution, and some novel solutions to deploy it.

The RIoT group is a nonprofit with more than 5,000 members, founded by Larry Steffann in 2014. A serial entrepreneur and general manager of the Wireless Research Center of North Carolina, Steffann understands the power of IoT and the impact it is poised to have on our economy and cities.

“The big economic driver in this world in the future ... will be IoT,” he said. His partner and executive director, Tom Snyder, teaches a product innovation lab at North Carolina State University and has 20 years’ experience in product development. The two host events to bring together IoT users, developers, executives and the community while facilitating education and conversation and fostering business and civic relationships to advance the

IoT movement.

The first part of the RIoT event was an industry-focused conference with lectures in their meeting spaces adjacent to NASCAR TV studios and control rooms. Nick Franza, manager of technology, innovation and development for NASCAR, opened the event and talked about how valuable and challenging it is to get real-time data from race cars during an event, and how engaging it can be for fans. He also talked about how IoT innovation will change the way the race series handles logistics and credentialing at the track.

The day was then split into business and technical breakout session tracks. I chose the technical track for the day and was treated to lectures by representatives from chip suppliers Renesas, NXP and Nordic, but my favorite was Dan Thyer (@LogicalDan), chief technology officer of the Industrial IoT firm Logical Advantage.

Wearing his connected T-shirt that blinked an LED sequence whenever someone mentioned him on Twitter, he talked about some of his home automation exploits. The day session finished with a tour of the NXP experience truck that was parked outside—filled with electronic gadgets and IoT eye candy that gave me plenty of ideas to bring back to the office.

The night session, held inside the NASCAR Hall of Fame, was free and open to the general public. Free beer helped lubricate the networking possibilities; there were short lectures from Arrow electronics supply and other tech companies. The event finished with a short lecture from Betsy Grider, managing director of technology for NASCAR, about the future of tech and the NASCAR brand.

Charlotte meetup group

The second event I went to was the monthly meeting for the Charlotte IoT Meetup Group, at the Snap AV offices in south Charlotte. It was a lecture and boot camp about the Microsoft Azure IoT back-end platform. Four of us from Enventys Partners brought our laptops and followed along as Microsoft



"The big economic driver in this world in the future ... will be IoT"

—LARRY STEFFANN, GENERAL MANAGER OF THE WIRELESS RESEARCH CENTER OF NORTH CAROLINA

representative Kent Stroker explained the power of the platform and how to set up data feeds.

Aproximately 50 people attended the Charlotte IoT meetup featuring Microsoft Azure. (Photo: Dan Thyer)

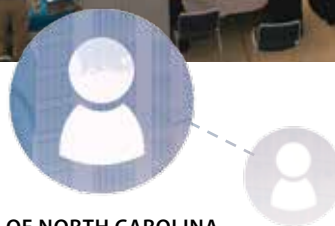
The Charlotte IoT Meetup, started by Thyer from Logical Advantage in 2014, has more than 1,000 members. The group has monthly meetups around Charlotte and hosts hack-a-thons and other educational events. Its meetings often focus on education and community; one of its recent hack-a-thons involved building connected devices to help paraplegics.

The Azure boot camp was my first time at the Charlotte IoT meetup group. The event, sponsored by Hackster.io, featured a short dinner and networking session, followed by Kent's lectures and labs. The lectures featured details about the IoT ecosystem and security, as well as some images of the monstrous

Microsoft data centers deployed all over the world to support it.

During the lab sessions, we set up our own Azure accounts and learned how to build data streams and displays. I had to lean on my electrical engineer intern, Elijah, pretty heavily for some of the more technical parts of the setup. It was an intense four-hour meetup, but I learned a lot and got to take home a free Adafruit Huzzah Wi-fi board to boot.

You need to understand many different parts and pieces to get an IoT device to work properly. Fortunately, with the momentum of the IoT movement, groups are sprouting up all over the United States and the world that teach how to deploy the technology. I encourage you to find your local IoT group to learn more and meet some people who can help with your next connected device. 📶



Clockwise from top left: Aproximately 50 people attended the Charlotte IoT meetup featuring Microsoft Azure.

Steve Sager from Renesas shows the data feed from his connected toaster.

Vendors roam the RIoT evening session in the main hall of the NASCAR Hall of Fame.

Dan Thyer presents Nick Browning with a connected fan to keep him more comfortable.

A Primer on Provisional Patent Applications

THEY HAVE COST AND STRATEGIC ADVANTAGES
WHEN EXECUTED PROPERLY **BY GENE QUINN**

First, an important distinction I have made before: There is no such thing as a provisional patent. You can, however, file what is known as a provisional patent application.

A provisional patent application will never itself mature into an issued patent, but in the right circumstance (and done properly) a provisional patent application can be a very useful tool for inventors. This is particularly true now that the United States is a first-to-file country—which must be interpreted as inventors needing to file first before disclosing anything about their invention, offering it for sale or using the invention publicly.

But let's start at the beginning.

PPA history

Since June 8, 1995, the United States Patent and Trademark Office has offered inventors the option of filing a provisional application for patent. This was the date on which a patent term changed from 17 years from issuance of the patent to 20 years from the earliest filing date of the non-provisional utility patent application.

Changing the patent term in this way would have led to an oddity, though. When you invent in the United States, you must obtain a foreign filing license before filing overseas—which is most easily accomplished by filing a patent application in the United States. But if you file a

non-provisional utility patent application, the patent term clock starts to run. Inventors outside the United States would be able to file a patent application in the country where they lived, which would lock in priority but not start the patent term clock running (because patent term starts based on the filing of a U.S. non-provisional patent application, not the filing of a foreign patent application).

To address this issue that would have given foreign citizens more rights than U.S. citizens, Congress simultaneously created a provisional patent application. This can be filed by anyone, locks in your priority filing date, and (like a foreign application) does not start the patent term clock. You get the benefit of a priority filing date without the patent term starting.

Provisional patent applications also provide a lower-cost, first-patent filing. For example, the filing fees for a small entity are currently \$130 for a PPA, compared to \$730 for a non-provisional patent application.

A provisional application for patent is a U.S. national application for patent filed in the USPTO. It allows filing without a formal patent claim, oath or declaration. The focus is on describing the invention as completely as possible, and many formalistic requirements of a non-provisional patent application are unnecessary to satisfy. A provisional patent application also provides the means to establish an early effective filing date in a later filed non-provisional patent application, allowing the term



“patent pending” to be applied in connection with the description of the invention.

A PPA has a pendency lasting 12 months from the date the provisional application is filed. The 12-month period can be extended only in extraordinary circumstances. Therefore, an applicant *must* file a non-provisional patent application claiming the priority of a provisional patent application within 12 months. If you miss the 12-month deadline, you may in extraordinary cases get an extra 2 months to claim priority to the provisional, but that currently comes with a hefty \$1,700 fee and is only applicable if there is an inadvertent or mistaken failure to file within 12 months.

Crucial considerations

Although the filing fees of a provisional patent application are less than for a non-provisional patent application, it is critically important to understand that a provisional patent application must describe the invention as completely as is required in a non-provisional patent application. Thus, a carelessly prepared, informal provisional patent application will provide no benefit and likely will be harmful because it can be used as evidence that you did not have a complete invention.

So why would you use a provisional patent application if you need to describe the invention to the same level as a non-provisional patent application? The best use of a provisional patent application is to establish priority rights as soon as you have an invention that can be patented. In a first-to-file world, you want to have a filing date as soon after your conception of the invention as possible.

In many circumstances, inventors continue to work with the invention, improve it or work on additional versions. If this is your plan, a provisional patent application is a great idea. File the provisional as reasonably soon as you can, making sure to describe what you have presently with as much detail as possible. Then as

you continue working on the invention, as you make more advances you may want to file another provisional patent application. You can file multiple provisional patent applications and then within 12 months of the first provisional file a non-provisional patent application that claims priority back to each of the provisional patent applications filed within the last 12 months. By doing this you get priority for your invention as close in time to invention as possible, which can be extremely important. You can also wrap all versions and aspects of your invention together into a single, non-provisional patent application.

Getting an early priority filing date is very important. Anything that comes after your priority filing date cannot be prior art. Prior art, which an examiner will use against you when examining your application, comes from that set of information that is available before you file a patent application. So filing a provisional patent application early and often can be very useful, so long as you describe the invention completely. 📌

It is critically important to understand that a provisional patent application must describe the invention as completely as is required in a non-provisional patent application.

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



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Meet the USPTO's Interim Director

JOSEPH MATAL HAS LONG D.C. TRACK RECORD, WAS AIDE TO POWERFUL GOP SENATORS **BY GENE QUINN AND STEVE BRACHMANN**

The newly selected interim director of the United States Patent and Trademark Office, Joseph Matal, is well known in Washington circles but less so by the broader patent community in the trenches. It's hard to predict what kind of impact he will have on decision making, given a variety of factors.

Matal's selection was announced by U.S. Secretary of Commerce Wilbur Ross on June 7. Matal was formerly the associate solicitor in the USPTO's Office of Solicitor. He served as a staffer in the Senate and is responsible for ushering the America Invents Act through the Senate in 2011.

The announcement did not specifically identify Matal as acting director, instead noting that he will perform the functions and have the responsibilities of the director during the nomination and confirmation process for the next director. The lead candidates for director of the USPTO are believed to be Andrei Iancu, the managing partner of Irell & Manella LLP, and Phil Johnson, former senior vice president for intellectual property at Johnson & Johnson.

USPTO Director Michelle Lee resigned on June 6, giving no reason for her decision.

Interim for how long?

Although Matal's intimate involvement with the AIA's passage will upset many stakeholders who are rightfully unhappy with the evolution of the Patent Trial and Appeal Board, it is difficult to predict how Matal views the PTAB because his Washington experience has been in support positions. Further, in all likelihood Matal has been placed in position as a Republican loyalist at a time when there were increasing questions about the wisdom of keeping Lee, a holdover of the Obama administration, in the USPTO's top position. Still further, if the rumor mill is accurate it would seem that Secretary Ross is close to making a recommendation to President Trump on the next director, so it would seem unlikely that Matal would be in charge for more than several months—hardly time to engage in anything particularly substantive.

Still, it seems significant that Matal was plucked from the solicitor's office and put in place over Commissioner for Patents Drew Hirshfeld and the many other senior-level managers. Although Matal may not be in the running for the post of director, he could easily wind up as the next deputy director of the USPTO. Recall that at the beginning of the Obama Administration, a similar move was made when then-Secretary of Commerce Gary Locke



brought back former Patent Commissioner and Acting Director Nick Godici to the office on an interim basis while the nomination and confirmation process unfolded. So a move to put a trusted ally in position is certainly not unprecedented.

Some say that Matal has no patent experience, which is not true. He has sufficient patent experience for the position, although not specifically patent prosecution experience. Matal is likable, knowledgeable and has been a key assistant to several powerful Republican senators. Although the track record of staffers coming to run the USPTO many not be great

in the opinion of many within the patent community, Matal's interim appointment should be well received by politicians who have wanted loyalists in positions of authority at agencies.

We are cautiously optimistic this is a step in the right direction, though cognizant of the legitimate fears of those who would have preferred someone more obviously likely to view the PTAB with the healthy skepticism that is so deserved.

His AIA background

The Ross announcement notes Matal's experience in briefing and arguing appeals of patent and trademark cases at the U.S. Court of Appeals for the Federal Circuit, as well as his prior roles as counsel for former senators Jeff Sessions and Jon Kyl.

Matal's LinkedIn profile notes that he had served as USPTO associate solicitor since August 2012, although he was recently detailed to senior staff to be chief of staff to Michelle Lee for several months before returning to the solicitor's office.

Between January 2011 and August 2012, Matal served as Kyl's counsel on the U.S. Senate Committee on the Judiciary, helping to co-manage Senate floor consideration of the America Invents Act; negotiate bill compromises with the House of Representatives; explain bill provisions to senators along with House and Senate staff, and draft provisions of the bill. After the AIA passed, Matal wrote a comprehensive guide detailing the legislative history of the AIA, which is largely regarded by those in the industry as the authoritative treatment of the AIA from the firsthand perspective of a key staffer.

The articles discuss the AIA's revisions to Section 102 and Section 103 of U.S. patent code, the creation of derivation proceedings, changes to the inventor's oath, the authorization of third parties to submit prior art, and bans on tax-strategy and human cloning patents. Also: Provisions concerning post-grant review

It is rumored that a recommendation for a permanent director could come soon. Matal is not in the running, though he could end up as deputy director.

proceedings, inter partes proceedings, supplemental examination, Section 18 business-method-review program, the new defense of prior commercial use, partial repeal of the best-mode requirement and deadlines for seeking a patent term extension.

Counsel experience

Between May 2009 and January 2011, Matal served as counsel to Sessions, then ranking member on the Senate judiciary committee. During that time, he also negotiated and drafted provisions of the bill, which would become the AIA. As well, his resume notes that he was a member of the senior leadership team for the Senate judiciary committee's Republican membership, supervised lawyers and provided advice on legal, policy, legislative and political matters. Before that, from April 2002 through May 2009, Matal served his first stint as Kyl's counsel with the Senate judiciary committee. During this time, he drafted and managed enactment of legislation on patents, copyrights and trademarks along with the False Claims Act, Federal Indian law, First Amendment issues, bankruptcy, whistleblowers, class actions, federal-question jurisdiction, criminal and national security matters.

In March 2000, Matal began a two-year stint as policy director for former Sen. Peter Fitzgerald. Before that, he was an associate attorney at Gibson, Dunn & Crutcher LLP, where he served as a member of the appellate and constitutional law practice group. He was a law clerk for the U.S. Court of Appeals for the Ninth Circuit (September 1997 to September 1998) and at the Alaska Supreme Court (September 1996 to September 1997).

Matal completed his undergraduate studies at Stanford University in 1993, graduating with a bachelor's degree in public policy and English. He obtained his J.D. doctor of law degree in 1996 from the University of California, Berkeley School of Law. 🐕

Steve Brachmann is a freelance writer located in Buffalo, N.Y., and is a consistent contributor to the intellectual property law blog IPWatchdog. He has also covered local government in the Western New York region for The Buffalo News and The Hamburg Sun.



Next Director Must Have Strong Patent Vision

Ever since the United States Supreme Court issued its decision in *eBay v. MercExchange* in 2006, patent owners have been under siege. Whether a never-ending series of judicial decisions that have significantly eroded the exclusive nature of a U.S. patent or the establishment of the Patent Trial and Appeal Board, patents have become greatly devalued. In some industries vital to the success of the U.S. economy—particularly software and biotechnology—patents are not just worth less, but may be worthless.

In 2016 and 2017, the Chinese government made significant improvements to the patent rules and laws there. As that landscape for patents and innovation continues to improve, expect more innovation to move to China as investors flee in search of better legal protections that are necessary to justify the speculative investment in early-stage, high-tech innovative companies.

Time is of the essence for the U.S. patent system. As reported on these pages, the 2017 worldwide patent rankings of the U.S. Chamber of Commerce showed the United States tumbling from first place into a tie for 10th place with Hungary.

With strong and principled leadership at the United States Patent and Trademark Office, it is not too late to turn the tide and restore the patent system to its former glory. I recommend in the strongest possible terms that the person selected as the next USPTO director share a vision for a stronger U.S. patent system that is again the envy of the world.

A pro-patent agenda led by a pro-patent leader is consistent with President Trump's pro-growth agenda, and will return the U.S. economy to GDP growth of 3 percent to 4 percent. Such growth is possible if the substantial patent burdens and obstacles placed on patent owners and patent applicants were to be removed. Unleashing the patent system and tapping into angel investors and venture capital is the solution.

It is imperative that the next director hold certain fundamental beliefs. He or she must:

- View issued patents as an important and valuable private property right.
- Believe issued patents are entitled to the statutory presumption of validity in all forums.
- Be committed to fundamentally reforming post-grant procedures in order to guarantee procedural and substantive fairness.

The next director must be an individual who fundamentally believes in a strong U.S. patent system, a strong and exclusive U.S. patent grant, and someone with sufficient breadth of experience to address the myriad issues facing the USPTO and the patent system. — *Gene Quinn*

Thomas Massie: America's Inventor Congressman

STRONG ALLY FOR PATENTS SPEAKS OUT ON LOBBYISTS, THE TROLLS MYTH, HOW TO MAKE A DIFFERENCE **BY GENE QUINN**

Congressman Thomas Massie never intended to become a politician when he was majoring in electrical and mechanical engineering at the Massachusetts Institute of Technology. “I look forward to returning to my prior life of inventing and working on my farm,” Massie told me in an extended interview on June 28. “I look at this as my service.”

Inventors and others who believe in the importance of patents to the U.S. economy no doubt hope that Congressman Massie—who has two dozen U.S. patents—is in no great rush to return to running his own company built on his inventions. He is a steadfast ally in the never-ending battle over the future of the U.S. patent system. And make no mistake: It is a never-ending battle.

“I can tell you, every day Congress is in session there are lobbyists here trying to weaken the patent system,” said Massie (R-Ky.).

In Massie’s words, those companies that come to Capitol Hill and lobby to weaken the patent system want to get into new fields—but they didn’t invent in those fields, so they face problems. Patent problems. A lot of those companies want to become automobile or cell phone manufacturers, or they want to write

software for operating systems, but they didn’t invent in those areas and don’t own the patents that have historically been the touchstone of innovation ownership.

“They’d love to just come in and start playing in those fields and start using their size and scale as an advantage, and to them, patents look like a hindrance,” Massie explained. “They are here in Congress looking to weaken patents and they are not just interested in weakening patents issued in the future, they are looking to weaken all patents.”

The distinction Massie draws about the interest in weakening all patents is important. Frequently, those lobbying for rules and laws that weaken patents claim to be doing so as part of an effort to ensure greater quality. Massie sees reform efforts differently.

“Reform is not about strengthening the patent granting system but about making it harder for patent owners to assert patents to protect their rights,” he said, emphatically. “They didn’t read the Constitution and come to say they have a better way more in line with what the Founding Fathers had in mind. They just want all the patents to be public domain today. It is very short-sighted to attack the patent system in this way.”

U.S. Rep. Thomas Massie (left) speaks with U.S. Inventor Managing Director Paul Morinville, who is part of a group that has been active in getting out a pro-inventor message to Congress.



PHOTOS BY GENE QUINN

“Of course the next generation will be better off, but it won’t be because of Washington, D.C. It will be because of the inventors who come up with life-saving devices, labor-saving devices ... we will build on those.” —THOMAS MASSIE



Unfortunately, it is easy to understand—at least from a mechanical/process perspective, how companies that would prefer the demise of the patent system seem to continually get their way on Capitol Hill. “There is a certain critical size companies reach before they hire lobbyists, which means only the big companies are represented on Capitol Hill,” Massie said. “Patents help the little guy. Whether you are a one-person company or a company with 10,000 employees, you have the same rights. That is repulsive to the company with 10,000 employees.”

Inventors need rewards

One of the well-worn talking points used by those lobbying against a strong patent system relates to the adage that inventors will invent regardless of whether they can obtain a patent, because that is what inventors do. Massie disagrees.

“I’m often amused at some of the academics who talk about intellectual property. They talk about inventions happening in the same vigor even if inventors are not compensated with a patent, and that notion is ridiculous. You have to make a living somehow. People will go into the field of invention if it is a lucrative field, and they won’t if it isn’t.

“Don’t be surprised if people don’t want to go into (inventing) if the reward system or compensation mechanism are taken away.”

Congressman Massie didn’t stop; he was on a roll. “We wring our hands at the notion we are falling behind in science, engineering, technology and math compared to other countries,” Massie said. He said it’s imperative to make inventing a lucrative field of endeavor for children to aspire to be a part of the industry.

More important, children need role models. “If you take away the compensation for their heroes—their role models—if you impoverish their role models, how are they role models anymore?”

Future can be bright

Massie said that America was founded on rugged individualism, where you own the fruits of your labor.

“Some people believe you didn’t build that and your idea doesn’t belong to you, but that notion is contradicted by the Constitution,” he explained. “The Constitution says ‘exclusive right’—which means that idea belongs to you, not to the community. ... Private ownership is what sets us apart from countries that have come before us. That whole system set up by our founding fathers a couple hundred years ago has served us well and is still not replicated overseas. So as long as we don’t screw it up, I think we are going to be competitive overseas.”

He is often asked: Will the next generation be better off than the previous one? Will we see our children have reduced economic opportunity?

“When I get that question, I think it is ridiculous,” he said. “Of course the next generation will be better off, but it won’t be because of Washington, D.C. It will be because of the inventors who come up with life-saving devices, labor-saving device—and we won’t forget those that were made five years ago, 10 years ago. We will build on those. So the next generation will be better off because of inventors, as long as politicians don’t screw it up.”

Inventors are not trolls

Massie became especially animated on another inventing subject. “Something that I find really offensive is this notion that inventors who don’t manufacture their own inventions are trolls.

“Somehow, inventors who don’t manufacture are on a lower moral footing than other careers. Inventors and engineers are just out to extract rent from other people if they don’t manufacture their ideas. That is ludicrous on several levels. Does an author have to have a printing press and a bookstore to have a legitimate career? No, that is ludicrous, but somehow lobbyists have been able to sell this idea that if you are an inventor and you don’t subsequently try and build a factory and distribution center to get your invention

(Continued on page 42)



Thomas Massie: America's Inventor Congressman

(cont. from page 41)

out there you are somehow not a legitimate member of society. That I find very offensive—and dangerous, too, if our society is going to be an information society.

"If we are creating this notion that ideas in and of themselves do not have value, we are in trouble, because our country has already decided to move from a manufacturing economy to an information society. Those two things are incongruous and are setting us up for failure.

Massie couldn't be more correct. Seventy percent of early U.S. inventors did not even graduate high school. The founding fathers purposefully set up a system that had one particularly unique attribute: Unlike the British patent system, the U.S. patent system was set up to be cheap enough for everyone to afford the fees, which meant that anyone could be an inventor.

Clearly, the founding fathers knew that the patent system they were purposefully creating to be affordable enough to be used by average citizens would lead to individuals obtaining patents on their inventions. The founding fathers also would have known that those average citizen inventors would not have the means to be able to manufacture but would instead license those patent rights to others. Therefore, the U.S. patent system was initially set up to purposefully create a licensing regime whereby inventors would invent and companies that manufacture and distribute would focus on what they did best. Fast-forward to today; suddenly, patents are only pro-competitive if you are a manufacturer.

Pick up the phone, he says

According to Congressman Massie, the best (and cheapest) way to communicate with a member of Congress is to pick up a phone and call. "I would not write a letter and I would not send an e-mail," Massie told me. "Fewer and fewer people think to pick up the phone and make a phone call, so it is a channel where there is not a lot of communication."

Massie pointed out that bots can send thousands of emails with similar scripts, and letters are frequently nothing more than a form letter that gets printed and sent by hundreds or thousands of people to hundreds of members' offices. "My Congressional Office receives 10 phone calls a day," Massie said. "A human has to respond when someone calls, so that makes it an excellent medium for contacting your member of Congress."

Increasingly, inventors and average citizens are taking the time to get more involved and go to the nation's capital. This comes with substantial cost and is probably not the best return on your investment, the congressman said.

"If you really want to get the attention of the congressman, go to one of their fundraisers. I don't care whether you are ideologically aligned on social or fiscal issues, but if patents really matter to you, do what high-dollar lobbyists do—which is to go to one of their fundraisers. I watch people spend \$5,000 to go on a trip to D.C. to meet with someone on the staff when they could have met with the congressman themselves back in the district for much less and received a much larger portion of their attention." 🐕

U.S. Patent System 'Solidly Mediocre'

CONCERNS ABOUT PTAB DOMINATE MEETING OF IP POWER PLAYERS

BY GENE QUINN



John Whealan, dean of IP at George Washington Law School, speaks at the International IP Commercialization Council's symposium on patents next to moderator Rob Sterne (left).

The International IP Commercialization Council's recent one-day symposium at the U.S. Capitol was full of IP power players—and concerns about the Patent Trial and Appeal Board.

"The results from the Patent Trial and Appeal Board reflect the procedures it applies, and in my judgment the procedures are wildly off base," said Paul Michel, retired chief judge for the U.S. Court of Appeals for the Federal Circuit. "If I had a magic wand, I'd make the procedures comply with those from federal court. ... It isn't that the PTAB is hostile to patents; it is that their processes can't accomplish anything else."

The event, "Promoting Innovation, Investment and Job Growth by Fixing America's Patent System," focused on the direct and essential role that strong and enforceable patents play in allowing investors and entrepreneurs to engage in the high-risk business of innovating.

Moderator Rob Sterne set up a question for Todd Dickinson (former director of the USPTO and current senior partner with Polsinelli) relating to the fact that so many people complain of "bad patents" issued dating to the end of the Clinton Administration. "A lot of people forget patents have a term," Dickinson explained. "Something like 75 percent of patent owners don't pay the third maintenance fee, so most of them expire after 12 years."

The 101 issue

Discussing what he sees as the real problems facing the patent system today, Dickinson said: "We have to stabilize 101. We just have to." (In June 2014, the United States Supreme Court struck down Alice Corp.'s patents on computerized trading methods, holding that abstract ideas implemented with a computer cannot be patented under Section 101 of the Patent Act.)

John Whealan, dean of IP at George Washington Law School, said it is sad to see what has happened with 101 and inter partes review, where the United States Patent and Trademark Office is invalidating roughly two-thirds of all patents. "The IPR system

is not fair ... The PTO doesn't presume what it does is right," Whealan said.

Judge Michel criticized PTAB procedures on a substantive level, explaining that its goal was to be an alternative to district court litigation. This has not happened. "PTAB is not the alternative; they are the prelude," he said. After reciting a litany of problems with litigating in district court—the expense, the length of time, how harassing it can be—he concluded: "After the America Invents Act, every one of those ills have gotten worse."

Said Whealan: "When you have a system that is issuing a thousand patents a day and then you have a system that when it looks at it a second time is invalidating two-thirds of them, and it's the same system, most industries don't work that way. This is affecting more than just the (small number of patents reviewed by PTAB); it is affecting the integrity of the system."

Whealan then succinctly identified the problem. "If you take away the presumption (of validity), that is why you are getting the type of results you are getting."

Said former USPTO Director David Kappos: "I don't think things are really getting much better. We are in what I refer to as the leaky life raft. When you are stranded and a leaky life raft comes along, it looks great, but it doesn't change the fact that it is still a leaky life raft. The best you can say about 101 is that it has stabilized in a terrible space."

"If you take away the presumption (of validity), that is why you are getting the type of results you are getting." —JOHN WHEALAN

Dangerous burdens?

In discussing this year's U.S. Chamber report on global IP, in which the United States fell from first to 10th in the world in terms of patents, Kappos summarized, "We need to admit that we have a solidly mediocre patent system ... we are in bad shape in relation to our patent system."

As the panel ended, Judge Michel said economists all seem to agree that the United States does not have enough productivity gains year over year, does not have enough gross domestic product growth year over year, and does not have the kind of technological breakthroughs we want and that we used to achieve. This is particularly concerning because most net new jobs and productivity gains come from innovative start-ups—and those innovative start-ups are the companies that the patent system has burdened most.

He referred to the conclusions of a recent Time magazine article, saying that the world is not prepared for the next pandemic and that America is in danger because we have strangled our innovation system. Let's hope our leaders in Congress and in the White House comprehend what all three branches of government have done to so heavily burden innovators and the U.S. innovation system before it is too late. ☐

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It Could Happen

If you're just getting used to the researched notion that humans will someday be falling in love with robots, this news may not surprise you: **Flying robots** are on the way!

A study by the Massachusetts Institute of Technology's Computer Science and Artificial Intelligence Laboratory says these robots could have the versatility to transition from driving to flying without colliding with each other in order to perform many important functions, from delivering packages to locating victims in disaster zones. "Our vehicles can find their own safe paths," lead author Brandon Araki told Live Science.

He said researchers had developed a flying monkey that could run, fly and grasp items—but that its routes had to be programmed because it could not find safe routes on its own.

Wunderkinds

Inspired by his mother's battle with breast cancer, 18-year-old **Julian Rios Cantu** of Monterrey, Mexico, invented a bra that could help women detect early signs of the disease. The "Eva," a prototype that resembles a sports bra, won the \$20,000 first prize at the Global Student Entrepreneur Awards in April. The bra, which would only have to be worn for 60-90 minutes a week, carries sensors that map the breasts' surface, color and texture. Increased blood flow to the skin that produces changes in temperature can sometimes reveal cancerous tumors. Mexico has a shortage of mammography machines.



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What IS that?

"Next time, pack a lunch with a surprise," urges New York-based e-commerce platform Storenvy. So much for a love note or a candy bar. The idea of **Lunch Bugs Sandwich Bags** is to deter coworkers from stealing your lunch in the company fridge by using bags that have authentic-looking bugs printed on them. Not even the fictional Phil, the accountant, "will put his dirty mitts on your lunch, if he thinks it's one step away from a salmonella outbreak."

\$587,000

The sum **George Harrison** had to pay when a judge ruled he was guilty of "subconscious plagiarism" with his 1970 No. 1 hit "My Sweet Lord," which musically resembled the Chiffons' 1962 hit "He's So Fine." The Chiffons recorded "My Sweet Lord" to draw attention to the trial. The copyright lawsuit was filed by Bright Tunes Music Corp. in 1971; litigation ended in 1998.

WHAT DO YOU KNOW?

1 On Aug. 12, 1930, which person received a patent for a method of packaging frozen foods?

- A) Carl A. Swanson B) James L. Kraft
C) Abraham Stouffer D) Clarence Birdseye

2 The one millionth U.S. patent was issued to Francis Holton for a tubeless vehicle tire on August 8 of what year?

- A) 1911 B) 1895
C) 1880 D) 1866

3 **True or false:** Glory Hoskin, who was granted a U.S. patent on Aug. 5, 1997 for an automatic talking potty apparatus, has 35 toilet-related patents.

4 Which oft-yellow product was invented first—the highlighter marker, or the Post-It note?

5 **True or false:** According to Bankrate, the cost to search for patents in the software category is \$2,500-\$3,000, with filing fees over the \$16,000 range.



ANSWERS: 1) D. Many consider Birdseye the founder of the modern frozen food industry. 2) A. In July 2015, the United States Patent and Trademark Office issued its nine millionth patent—to Matthew Carroll of Jupiter, Florida, for a windshield washer conditioner. 3) False. She is not flush with patents; the potty apparatus (designed to familiarize children with the toileting process) is her only one. 4) The highlighter was invented by Dr. Frank Honn in 1963 and produced by Carter's Ink Co. The Post-It note was invented in 1974 by Arthur Fry, a 3M chemist. 5) True.

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