

Inventors

OCTOBER 2018 Volume 34 Issue 10

DIGEST

The Music In Us

FIRST ATTACHABLE AMP
FOR AN ELECTRIC GUITAR

FUTURISTIC NEW INSTRUMENTS

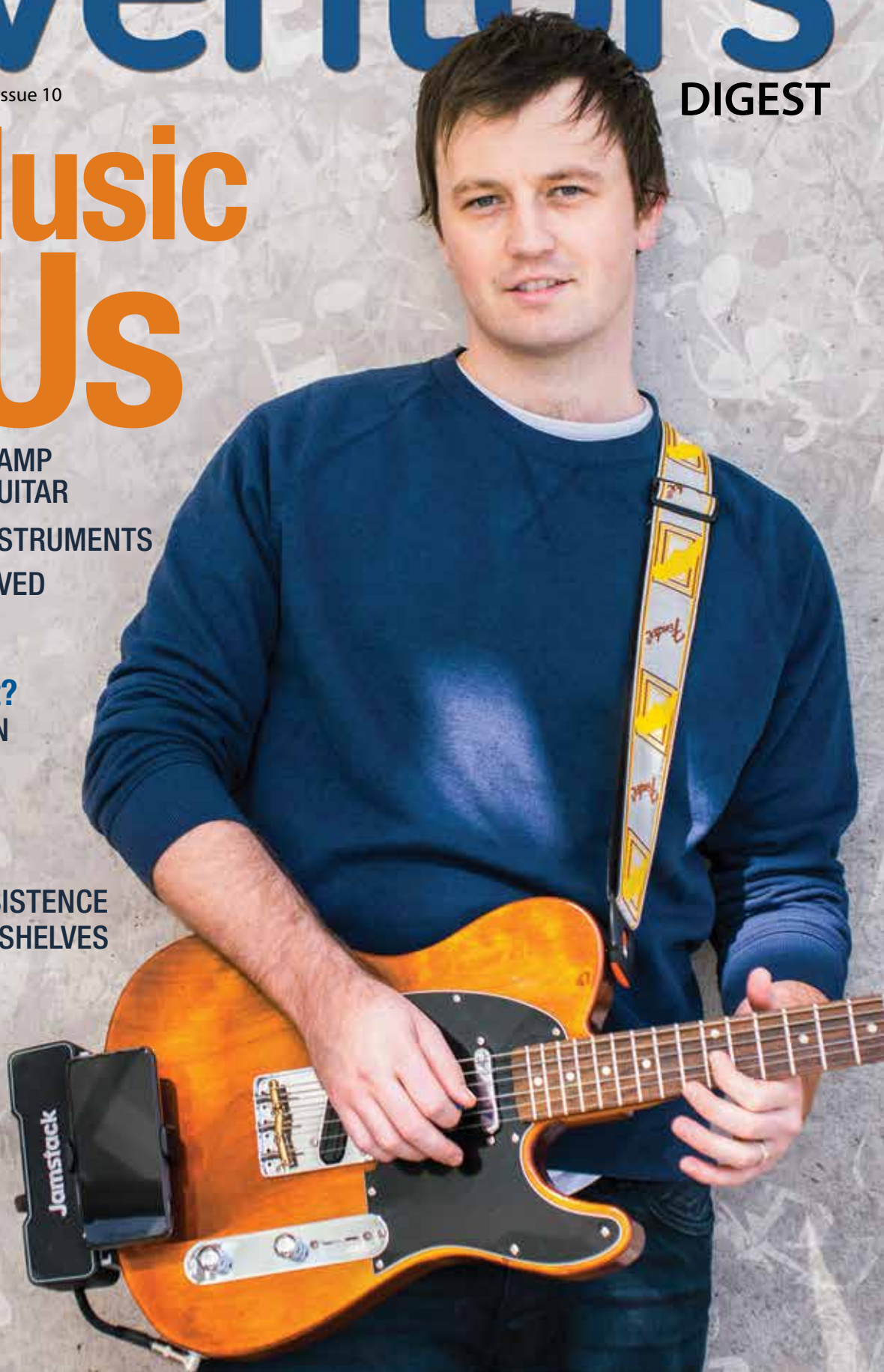
REEL-TO-REEL REVIVED

A Trick, or a Treat?

ICONIC CANDY CORN
HAS ITS HATERS

**Conquering
Mount Walmart**

JOHN MACK'S PERSISTENCE
GOT PRODUCTS ON SHELVES



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At Enventys Partners, we build new products, create new brands and breathe new life into existing ones using an efficient, collaborative approach. We believe there are two ways to grow your business: introduce innovative new products or sell more of the products you already have. Whichever approach fits your needs, we can help you thrive with a proven strategy that delivers quantifiable results.

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ENVENTYS
PARTNERS

EDITOR-IN-CHIEF
REID CREAGER

ART DIRECTOR
CARRIE BOYD

CONTRIBUTORS
STEVE BRACHMANN
ELIZABETH BREEDLOVE
HOWIE BUSCH
LOUIS CARBONNEAU
JACK LANDER
JEREMY LOSAW
GENE QUINN
JOHN G. RAU
EDIE TOLCHIN

GRAPHIC DESIGNER
JORGE ZEGARRA

INVENTORS DIGEST LLC

PUBLISHER
LOUIS FOREMAN

**VICE PRESIDENT,
INTERACTIVE AND WEB**
VINCENT AMMIRATO

FINANCIAL CONTROLLER
DEBBIE MUENCH

SUBSCRIPTIONS
LOURDES RODRIGUEZ

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Ad rates, subscriptions & editorial content:
520 Elliot Street
Charlotte, NC 28202

info@InventorsDigest.com www.InventorsDigest.com
reid.creager@inventorsdigest.com



Piano's Story Has An Important Lesson

Bartolomeo Cristofori invented an iconic musical instrument on which I refused to take lessons as a kid. For about five decades now, I've had more than 88 reasons to regret my stubbornness.

There's something uniquely grand about the beauty of a piano—and not just how it looks. A solitary high-note key can evoke stark loneliness in poignant depth, a low-note key impending doom; a skilled, full-keyboard demonstration produces an audio smorgasbord of disparate notes melding into a cohesive concert at one's fingertips.

Cristofori created beautiful music throughout his life. Born in the mid-1600s in Padua, Italy, he was already making harpsichords at the time of his invention. According to *The World Atlas*, when Prince Ferdinando de Medici—the heir of the grand duke of Tuscany, Cosimo III, and a harpsichord aficionado—met Cristofori, he made him his technician for musical instruments and gave him a house in Florence with equipment and utensils.

A keyboard instrument, the harpsichord was a prominent forerunner to the piano. But it couldn't play notes with variations in softness. A tiny device called a plectrum plucked a string to play a note.

Cristofori solved this problem. His invention (around 1709) used a hammer-and-damper system that was controlled by pressing keys and using foot pedals, resulting in a better modulation of volume. Initially, he called his creation the "clavichord with soft and loud" before it was shortened to pianoforte.

He built about 20 more pianos—but like so many inventions, it wasn't well received for a while. People said it was difficult to use. He died in 1731 without a patent; it was rare to have one at that time.

Like most great inventors, Cristofori was undaunted by criticism. The musical inventions you read about in this month's *Inventors Digest* undoubtedly also had skeptics and still might, given how unconventional many of them look and sound.

But their creators knew that what is not tried often results in the most regret. That's a key tenet of the innovative spirit.

—Reid
(reid.creager@inventorsdigest.com)

INGENUITY IS AMERICA'S MOST VALUABLE RESOURCE.

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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.

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AMERICAN
INVENTOR**

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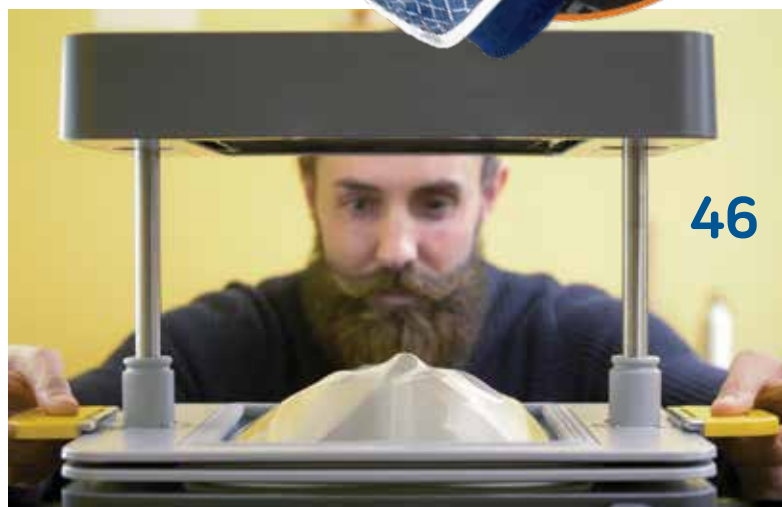
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Chris Prendergast,
founder of JamStack;
photo by Ingrid
Forster Photography

BRIGHT IDEAS



Lyd

SMART BOTTLE

lydbottle.com

The Lyd bottle has a patent-pending, spill-proof automated lid

that opens at the touch of your lips and closes when you finish. Its 360-degree design lets you drink from any point on the top of the bottle.

The bottle, made of double-walled steel, has a vacuum-insulated flask that keeps cold drinks cold and hot drinks hot for many hours. Lyd features wireless charging; the battery charges in 4 hours. You can access your drink with a manual click of the lid if the battery is out.

The bottles are made of reusable materials. Lyd's 13.-oz bottle and Qi charger will retail for \$69, or \$79 for the 17.-oz. bottle. Shipping for crowdfunding Rewards backers starts in November.

Lumen

FITNESS MONITOR

indiegogo.com

Lumen is a pocket-size device and app that measures your metabolism through your breath. (Your metabolism is not fixed; it changes each day depending on the food you eat, whether you work out, and how much sleep you get.)

The app gives you daily, personalized meal plans to help you lose weight and optimize your workouts. You can see each morning how your metabolism is affected by yesterday's sleep, activity and food choices. Lumen helps you answer questions about your body.

The technology has been supported by years of scientific studies.

Lumen will retail for \$299, with shipping for U.S. backers planned in February.





InstaDreamer

DREAMS CONTROLLER

instadreamer.com

The goal behind this bracelet is to control your dreams. It uses Pavlovian conditioning through subtle vibrations that are to train your brain to recognize when it's dreaming.

In day mode, InstaDreamer vibrates as many times daily as you choose, reminding you to perform a reality check using Pavlovian conditioning. In night mode, it detects your REM phases and vibrates at the best moment of your dream to begin a lucid dream by activating the conditioning. You will know you are dreaming and can experience whatever you want.

The InstaDreamer is not connected at night. It is a stand-alone device (offline) and will upload data to your phone as soon as it detects a network that your phone can access. The band will retail for about \$250 U.S., with planned shipping in February for backers.

**"If you always do what you always did,
you will always get what you always got."**

—ALBERT EINSTEIN



PIX

SMART, ANIMATIVE BACKPACK

pix.style

PIX lets you control your backpack's appearance from your smartphone. You can choose from a library of pictures, animations, widgets or games, or upload your own design.

To operate: Download the "PIX Backpack" app for iOS/Android; pair the backpack with your smartphone; then choose or create content and upload it to PIX.

You can display information such as the time, weather, your mobile notifications and more through PIX's widgets. You can play 8-bit games, too.

The backpack will retail for \$260. Shipping for Rewards backers is to begin in January.

Bittersweet Existence

IT'S AN ICONIC HALLOWEEN TREAT—SO WHY DOES CANDY CORN GET SO LITTLE RESPECT? **BY REID CREAGER**

MOOSE A. MOOSE sang that he would rather eat his feet than candy corn. Teens who remember “I Don’t Like Candy Corn” from the kids’ cable TV network Nick Jr. often talk about how scary the video accompaniment was (not to mention the bad singing).

Like Lady Gaga—Halloween-ish in her own right—candy corn is a colorful enigma. The iconic treat has been around for about 130 years as an October snack staple even though many, in the spirit of Moose², would rather eat staples. An independent film company chose “Candy Corn” as the title of its Halloween horror movie set for release next year.

So where did candy corn get such a bad rap? Sure, it’s made of mostly un-nutritious and maybe even questionable stuff, including Yellow 5 and Yellow 6 food dyes that are under scrutiny. But you can legitimately question the content of virtually any candy product.

Depending on the manufacturer, one serving of candy corn has 110-140 calories,

which is fewer than a cup of raisins. Regardless of who makes it, it’s generally inexpensive and easy accessible by the handful. It can be left uncovered for weeks at a time with no effects (though some say this isn’t a good thing). So its longevity as a Halloween snack favorite is no fluke.

Country-styled origins

Candy corn’s origins reveal a clever marketing strategy during a time when much of America was rural. Said to have been invented by George Renninger of the Wunderle Candy Co. in the 1880s, its recipe was acquired by the Goelitz Confectionery Co.—now Jelly Belly Candy Co.—and produced commercially at its Cincinnati factory. The box said “chicken feed,” with a rooster on the front.

“The product was so successful it carried the company through two world wars and the Depression,” according to a page about candy corn on the Jelly Belly website. “Turn-of-the-century ads and packaging of candy corn claim Goelitz as ‘king of the candy corn fields.’ For seventy-five years, candy corn and what were called ‘buttercreams’ were the mainstay of (the) Goelitz business until another sensation, Jelly Belly jelly beans, overtook the candy corn tradition in popularity.”

Perhaps candy corn’s staying power can at least be partially attributed to the fact that it is a dependable

CANDY CORN NUGGETS

- October 30 is National Candy Corn Day.
- More than 35 million pounds of candy corn are estimated to be produced each year, or about nine billion pieces—enough to circle the moon nearly four times if laid end-to-end.
- Halloween accounts for 75 percent of the annual candy corn production.



Candy corn is said to have been invented by George Renninger of the Wunderle Candy Co. in the 1880s.

constant. Although some ingredients may vary depending on the manufacturer, it's always been essentially a mix of sugar, fondant, corn syrup, vanilla, and marshmallow creme, variously colored yellow, orange, and white, and poured into kernel-shaped molds.

The kernels are now part of a fully mechanized process. Not so back in the day. According to Jelly Bean Candy Co., in order to make a tri-color kernel, a candy-maker called a runner "made three separate passes with 10 pounds of hot steaming fondant, depositing a little bit of candy at just the right rate into cornstarch molded with the kernel shape. These passes required great strength and endurance, since the runner had to lift and carry the big buckets called 'stringers' of hot cooked candy, which appears to come out of the bottom of the bucket in 'strings.'"

The surveys said ...

Your current reading notwithstanding, Americans take their candy very seriously. Best/worst candy elections abound online. Not surprisingly, in a 2013 National Confectioners Association survey 72 percent of Americans said chocolate is their preferred Halloween treat. Candy corn was a distant second at 12 percent.

Candystore.com claims to have the definitive candy rankings, using surveys from 40,000 of its own customers while also factoring in results published from other websites ranging from Huffington Post to Bon Appetit. The comprehensive Candystore survey ranked candy corn No. 2 on its worst candy list, behind only circus peanuts.

Still, the blog's author defended the orange, white and yellow as one might defend the red, white and blue.

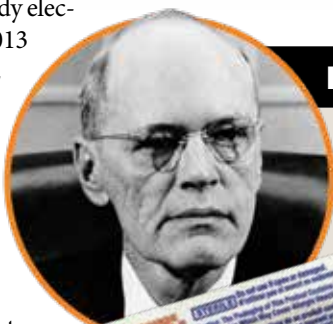
"Look, if you don't like candy corn, you can just give it to me. Yes, it's just sugar. Isn't that the point? Candy corn is nothing special. There are absolutely better candies out there. But if you can't enjoy stuffing handfuls of candy corn into your pie hole, well, I don't even know what to tell you." 🍬



USPTO OFFERS CONTEST

Speaking of Halloween, October 31 is the deadline for entering the United States Patent and Trademark Office's Anti-Counterfeiting Video Contest.

Entrants are asked to create a 30- to 60-second video showing the harmful effects of counterfeit products and the need to stop them at home and abroad. Various cash prizes can reach \$2,500. For more information, see uspto.gov/trademark/trademark-updates-and-announcements/anti-counterfeiting-video-contest

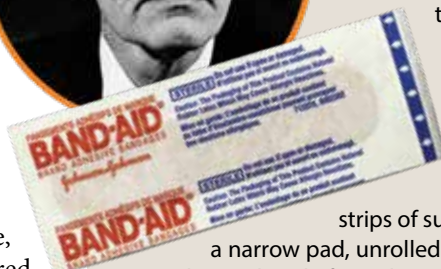


INVENTOR ARCHIVES: OCTOBER

October 10, 1892: The frequent small kitchen accidents encountered by his wife, Josephine, ultimately resulted in a landmark invention by **Earle Dickson**: the Band-Aid. She often nicked her fingers while working or preparing meals, and the big bandages used to stop the bleeding were cumbersome.

Dickson affixed small pieces of sterile gauze to the center of strips of surgical tape. He folded the gauze into a narrow pad, unrolled the tape, laid the gauze over it, and put down a band of crinoline to keep the tape from sticking to itself. He then rerolled the tape so that his wife could unwind and scissor off what she needed.

Dickson, working for Johnson & Johnson at the time as a cotton buyer, showed company officials his invention. Sales were slow until the company distributed an unlimited number of free Band-Aids to Boy Scout troops across the country, leading to widespread use.



Marketing With Facebook Groups

IF YOUR BRAND IS A GOOD FIT,
HERE'S HOW TO MAXIMIZE RESULTS **BY ELIZABETH BREEDLOVE**

A LITTLE OVER A YEAR AGO, Facebook rolled out Groups for Pages. Since then, many brands have taken advantage of the unique opportunity that these groups provide for encouraging engagement and building a community.

Inventors can take advantage of this feature by creating a group focused on their product or company. For the inventor looking to increase results on social media, Facebook groups can be a wonderful way to improve his or her Facebook presence. Read on to learn more about how to decide whether you need a Facebook group, how to set up your group and how to get the most out of it.

Do I need a Facebook group?

Before you go through the effort of setting up a Facebook group, ask yourself whether it will help you achieve your ultimate goals and if you have the capacity to do the work needed to make it successful. Consider:

- Does your invention lend itself to a Facebook group? In general, you'll find that consumer products are better suited to a Facebook group than products geared toward businesses. Of course, there are exceptions to this; either way, consider whether your product is something that lends itself to user discussions. Is there a community of like-minded people who would enjoy discussing your brand and related topics among themselves?
- Are your users on Facebook? How many likes do you have on Facebook? What does your engagement on your Facebook page look like? If you don't have any activity on your Facebook page or your users aren't on Facebook, you'll have a hard time making your Facebook group a success.
- What are you hoping to get out of the Facebook group? Do you need user feedback on your current product or upcoming products? Have your customers shown you that they've found new, unique ways to use your product that they could share with others? Do you get many emails or

questions that other users could help you answer? What conversations are you wanting to start in your group? If you aren't looking for feedback, don't need to grow a community of users who can inspire each other, and you don't get a lot of questions or comments that need answers, a Facebook group may not be necessary. However, if you feel that you and your company could benefit from establishing a community around your product or brand, a Facebook group is a great way to do it.

- Can you devote time to participating regularly, moderating comments and growing the group? Plan to spend at least a few days a week monitoring your group, though as it grows you'll likely need to check on it more often.

Setting up a Facebook group as a Facebook page

First, it's worth mentioning that if you want your Facebook group to be associated with your Facebook page, you'll need to be an admin of the page. Then you're ready to create your group.

1. Go to your Facebook page and in the column on the left, click "Groups." If you don't see this option, you'll need to click "Settings," "Edit Page" and "Add a Tab," then add a group tab.
2. Click "Create Group."
3. At this point, you'll be able to name your group, add people to your group and configure your privacy settings. This name is public, so choose the name carefully. Make sure to add your personal page to the group as well so that you can interact as yourself or as this business page. Once you have all of this information entered, click "Create" to create your group.

Congratulations—your group exists! However, there are some things you should do to set up and personalize your group and make it more user friendly for your customers.

- Upload a cover photo. Pick one that highlights your invention or product!



Before setting up a Facebook group, ask yourself whether it will help you achieve your ultimate goals and if you have the capacity to do the work needed to make it successful.

- Edit your group's info. Go to "More" below the cover photo, then click "Edit Group Settings." This gives you the option to add a category, description, tags, locations, your website and other important information.
- You may want to add rules to your group to set boundaries about what can be discussed and what is not allowed. It's OK to be strict here; after all, it's your group! Rules should be structured to encourage engagement while limiting off-topic discussion. You will probably also want a rule about harassing comments and behavior.
For more tips on setting up and moderating your group, visit Facebook's Help Center.
- Make sure you're staying involved in the group! Don't just ask questions; respond to comments as well. Facebook makes it easy to interact both as yourself and as your brand's Facebook page.
- Consider creating "theme" days! For example, perhaps on Mondays you encourage users to post a picture of them using your invention; on Tuesdays you allow them to get off-topic and talk about their own businesses or ventures; on Wednesdays you post a poll, etc.
- Set up a live Q & A session in which your group members can ask a question for you to answer in real time. Make sure to promote it beforehand.
- Post tutorial videos to help your customers get the most out of your invention.
- Encourage group members to invite their friends. One way to do this is to ask a question that encourages them to tag someone.

Getting the most out of your Facebook group

Once your group is ready to go, you can begin adding people. Start by inviting your Facebook page's fans to join the group. You may eventually want to close the group to keep it a bit more exclusive, but when you are trying to grow it initially it's a great idea to leave it "open" so that Facebook users can find it.

As soon as you have a small number of people in your group, you can begin posting content. Some tips:

- A few times a week, start conversations by posting relevant content that can cause other group members to respond. Ask a question, offer up a tip or post an interesting link.
- Did you know that groups can host events? Consider hosting a meet-up, networking event or other event to take your community offline.

Ultimately, with a bit of effort upfront and regular moderating, a Facebook Group for your invention can be a great way to curate a community and take your business to new heights. 📌

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.



When Interests and Egos Collide

F.M. INVENTOR ED ARMSTRONG WAS HAUNTED BY LEGAL BATTLES AND OTHERS' CLAIMS **BY JACK LANDER**

THIS IS A TRUE STORY. And like many stories, it has a protagonist, (the main character, usually a hero) and an antagonist, (the purported villain who opposes the hero). It also has a third important character who slips in and out of the story as the super-villain.

First, a bit of background about the characters. "Ed" Armstrong, a young inventor born in 1890, is the main character. He was inspired by a book his father gave him, "The Boy's Book of Inventions." After reading magazine articles about Italian inventor Guglielmo Marconi, he settled on wireless communication as the field in which he would invent.

His father had a good job, and the family owned a home large enough for Ed to have a room he could devote to experimenting with wireless transmitters and receivers. Soon, Ed and his friends were sending local messages to each other via wireless. If we assume that Ed

was around 16, this would have been in 1906. He graduated from Columbia University as an electrical engineer and taught there for many years.

Next is an ambitious 15-year-old immigrant named David Sarnoff, born in 1891. He spoke only Russian but got a job selling newspapers to help support his family. His father was in poor health and worked only sporadically.

David was helped by an unknown benefactor to buy a newsstand in New York City's Hell's Kitchen. In a further effort to expand his newsstand business, he applied to a well-known newspaper business but went through the wrong door and found himself hired by the Commercial Cable Co. as an errand boy, janitor, etc. (We'll have to assume that he delegated the routine work of the newsstand to an employee.)

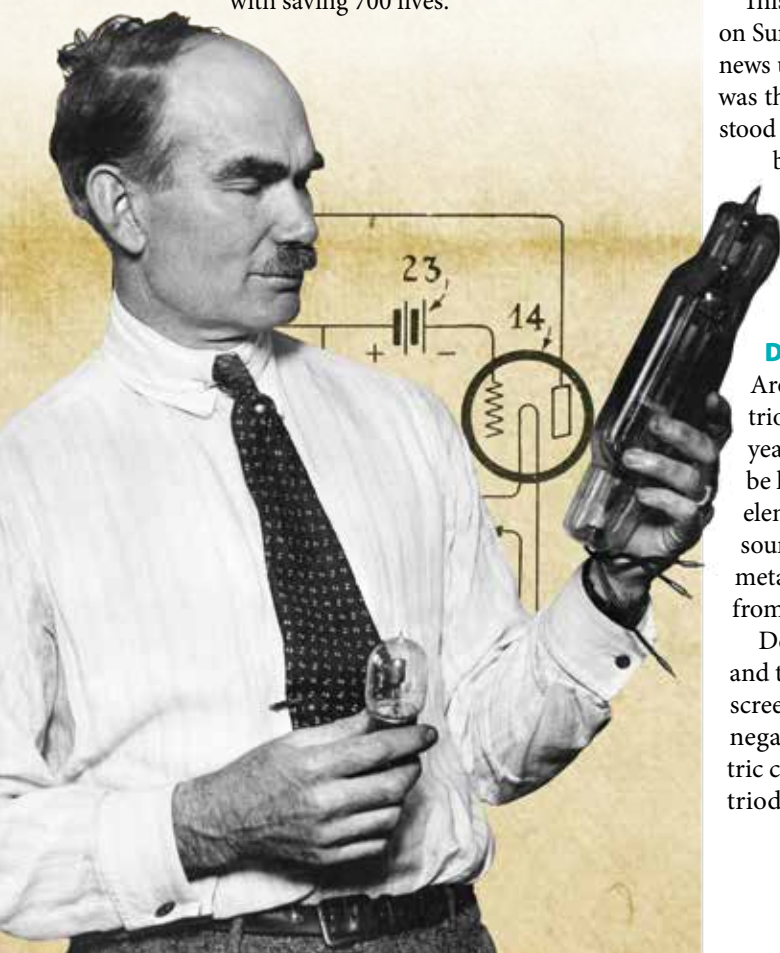
Two of the main characters in our story are RCA President David Sarnoff (left) and F.M. inventor Ed Armstrong (center), who were friends for decades. The other is Lee de Forest (right), the inventor of the Audion (triode) vacuum tube who was ruled the legal inventor of regeneration at the end of more than 10 court battles with Armstrong.



The third character is Lee de Forest, born in 1873. He attended Yale University, but his critics say that he never truly understood radio frequency (wireless) theory. Unlike Ed and David, who understood what they were doing, Lee was accused of solving problems by trying many different ways of connecting the components of wireless and observing his results.

A few related dates and events that are important to the story:

- 1883: Thomas Edison discovered and patented the “Edison Effect.”
- 1900: Marconi transmitted and received a signal that went 5 miles.
- 1901: Marconi transmitted the first radio transmission across the Atlantic Ocean, from England to St. John’s, Newfoundland.
- 1906: Canadian inventor Reginald Fessenden, inventor of A.M. (amplitude modulation), transmitted the first voice and music to ships at sea.
- 1906: Lee de Forest invented the triode radio tube, used as a detector and amplifier.
- 1912: Morse code transmissions from the Titanic were received and relayed by the Carpathia, a ship 58 miles away. Wireless transmissions at sea were limited to about 100 miles at this time. The Titanic was about 1,300 miles from New York City when it sank. Marconi’s wireless invention was credited with saving 700 lives.



A tall Titanic tale?

We begin the story with David Sarnoff, who left his job as junior telegrapher with the Commercial Cable Co. to take a job as telegrapher with Marconi Wireless Telegraph Co. Marconi had been his hero from the time he first read about him in the papers he delivered and sold. When Marconi visited his New York office, Sarnoff boldly introduced himself and a now-and-then relationship of mentor and mentee began. Even though he was young, Sarnoff quickly gained stature in the company and was assigned to sea voyages in order to become an expert in ship wireless equipment and its use.

Edward Nally, Marconi’s New York City branch manager, was experienced with the transatlantic cable but knew nothing about wireless. Sarnoff, who left school in the eighth grade, was a competent, self-taught engineer by age 22 and taught Nally the theory and practice of wireless communication. He also taught telegraphy and wireless technology at the Marconi Institute, another of Marconi’s businesses.

At some point, Sarnoff and Nally became close friends. One account claims they were together the evening of April 10, 1912, when the Marconi station atop the Wanamaker department store in Philadelphia received the relayed news that the Titanic had struck an iceberg and was sinking.

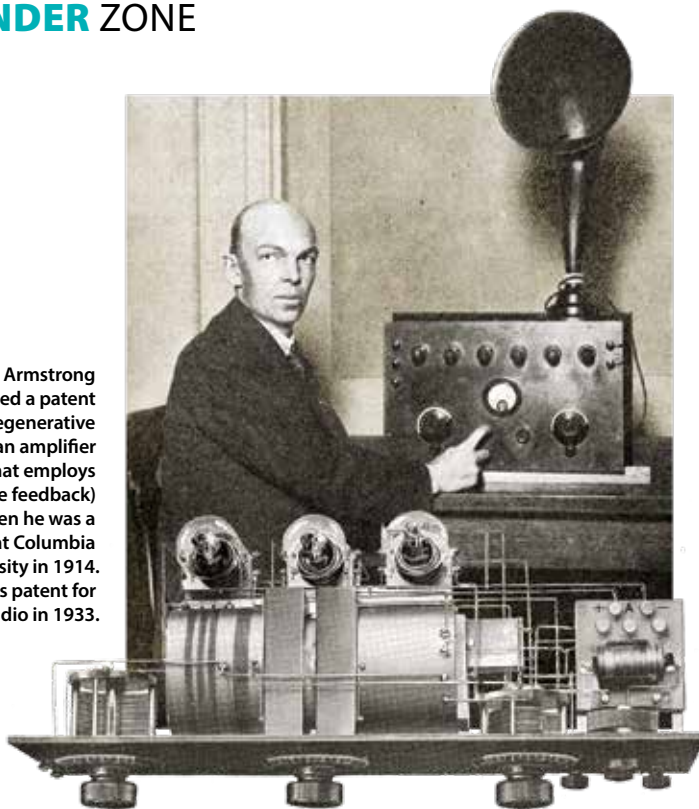
This is doubtful because Wanamaker’s was closed on Sundays. Thus, Sarnoff probably didn’t receive the news until Monday morning. Sarnoff claimed that he was the first shore operator to receive the news and stood by his key for 90 hours until all passengers had been accounted for. That blatant exaggeration was refuted by two operators who were receiving and sending from the station during the crisis. Yet Sarnoff’s version became legend, one he told and retold throughout his long career.

De Forest and the triode

Around this time, Lee de Forest had invented the triode, or three-element radio tube. Twenty-three years earlier, Edison had discovered what came to be known as the “Edison effect.” If a second metal element was added to Edison’s lamp and a power source connected between the hot filament and the metal element, now called the plate, current flowed from filament to plate.

De Forest added a “grid” between the filament and the plate. The grid was something like a coarse screen (as in window screen). By applying various negative voltages to the screen, the flow of electric current would be reduced proportionately. The triode, a.k.a. the Audion, became the workhorse

Ed Armstrong received a patent for the regenerative circuit (an amplifier circuit that employs positive feedback) when he was a junior at Columbia University in 1914. He got his patent for F.M. radio in 1933.



Lee de Forest claimed that he was the first inventor of the regeneration circuit that Armstrong had patented. David Sarnoff, Armstrong's old friend, tried to prevent him from popularizing F.M.

of wireless technology—useful for detecting radio waves, amplifying them and converting them to audio frequencies that powered headphones and loudspeakers.

Before the invention of the triode, detection was accomplished by using a “coherer.” This was a glass tube filled with nickel and silver granules. The coherer was wired in series with a battery and headphones. When the coherer received an incoming dot or dash of Morse code, the granules were drawn together due to the current flow, became a better electrical conductor, and the current passing through it powered the clicks heard in the headphones of the receiving telegrapher.

Thus, the triode was a triumph of technology—so much so that de Forest proclaimed himself the father of radio. Of course, he was ignoring the 20 or so other inventors of critical links in the radio invention chain, from the invention of the electrical battery by Alessandro Volta in 1800 to the triode in 1906.

A bitter challenge

In 1913, Sarnoff visited the laboratory of professor Michael Putin, who had hired his friend and Columbia graduate Edwin Armstrong. Armstrong demonstrated a regenerative radio receiver, a concept he conceived while in school. The principle of regeneration was to feed back a part of the amplified output signal to the input stage, which boosted the output many times.

This scheme resembled having an emergency home generator and plugging it into a wall outlet to generate the power it would use to power itself and your home. But this was not perpetual motion. Energy was added from the circuit's power source, thereby enabling the regeneration. Armstrong filed for and was granted a patent. The regenerative principle, which depended on de Forest's triode, became the basis for oscillators that were the heart of sophisticated transmitters and Armstrong's invention of the remarkable superheterodyne radio receiver, a principle that is still in use today.

In 1917, Sarnoff had been promoted to commercial manager of the Marconi organization; he had charge of 725 employees and 582 radio installations. He licensed the rights to Armstrong's regeneration patent, No. 1,113,149. His vision and management kept him on an uphill path, and he became general manager of RCA in 1921—four years after it was formed as a subsidiary of General Electric. He was promoted to president of RCA in 1930, a position he held until 1947 when he became chairman of its board. His service to RCA was interrupted by World War II, when he served Gen. Dwight D. Eisenhower as the head of all wireless communications for the Allies. He left the Army as a brigadier general.

Meanwhile, de Forest claimed that he, not Armstrong, was the first inventor of the regeneration circuit that Armstrong had patented. This appears unlikely because of other work he was doing for two or three years between the date he claims to have invented it and the date he challenged Armstrong's date of invention. The importance of the invention clearly would have taken top priority unless its potential had not been understood. Armstrong won the litigation that followed.

But over a decade, more than 10 court battles ensued over who was the *legal* inventor of regeneration, including a 1934 trial before the U.S. Supreme Court in which de Forest was judged to be the legal inventor. Armstrong's appeal claimed that RCA had misled the court on a scientific fact that all electrical engineers understood to be RCA's error. But the court's decision stood. De Forest was the legal inventor of regeneration because the court had not understood the fine distinctions in the technical wording of Armstrong's patent.

Professional vindication

Armstrong was wealthy from his patents. He had \$5 million in the bank and potentially several more millions in stock. He had little practical reason to hate de Forest. But Armstrong was not a forgiving person. He judged an issue or a person to be right or wrong without any shades of gray. He considered de Forest to be an intellectual and legal fraud, one villain in this long story.

In spring 1934, Armstrong was invited to speak to the Institute of Radio Engineers at its annual meeting. The group got wind of Armstrong's intention to return the IRE Medal of Honor it had awarded him in 1918. At a point in his speech where it became obvious of his intent, he was interrupted by the master of ceremonies who reminded Armstrong that the award had been for "... engineering and scientific achievements in relation to regeneration and the *generation of oscillations by vacuum tubes* ... and that the institute strongly reaffirms the sense of what it believes to have been the original citation."

In tears, he thanked the institute for confirming the validity of his medal. The main value of Armstrong's regeneration turned out to be the discovery of a means of oscillation—that is, the generating of the radio frequency signal that is the basis for all radio and TV transmission and reception.

Armstrong was aware of the susceptibility of A.M. (amplitude modulation) to noise from lightning and local electrical machinery, even ignition noise from nearby passing cars. By 1934, after several years of development, he perfected F.M. (frequency modulation) and had filed for several patents.

In 1935, he arranged to demonstrate his system before the Institute of Radio Engineers. The demonstration was extraordinarily impressive, the audio fidelity superb. Even the tearing of a piece of paper was received with perfect clarity and absent any noise. Armstrong was again an acknowledged inventive hero.

(At this point, imagine the twirling of a super-villain's handlebar moustache.)

Final interference

Armstrong's old friend, Sarnoff, recognized the truly great improvement of F.M. over A.M. but considered it a commercial revolution rather than evolution. Thousands of transmitters would become obsolete, along with millions of radios. He knew that F.M. would be the preferred system someday, but his aim was to delay it until RCA could make the most profit from it.

Sarnoff, who had connections with the federal government due to his commendable radio communication achievements for the military in World War II, lobbied the Federal Communications

Commission to reject Armstrong's request for a license for an experimental F.M. station. Only when Armstrong threatened to take F.M. overseas did the FCC yield and grant him a small F.M. band.

As the tiny Yankee Network grew, it was no immediate threat to Sarnoff. But he feared it may proliferate and offered to buy a license for F.M. from Armstrong, who would not sell outright and demanded that RCA pay royalties (as other radio manufacturers did). Sarnoff refused. RCA, meanwhile, was said to be working on its own F.M. circuits while making and selling F.M. radios, reportedly violating and ignoring Armstrong's patents.

At the end of World War II, the FCC moved the F.M. frequency band and reduced the allowed broadcasting power. This action made existing transmitters and radios obsolete. Sarnoff's role in the change is not known but seems highly likely, considering his part in the legal battle that followed.

Armstrong sued RCA and NBC (its subsidiary) in 1948. An army of Sarnoff's lawyers dragged out the proceedings with endless hearings on inconsequential matters that were peripheral to the main issues. The five years of personal harassment and delays took their toll on Armstrong's personality and health. He had spent his fortune on lawyers and claimed that he was nearly broke.

On Thanksgiving Day in 1953, he quarreled with his wife, Marion, and she moved out. On Jan. 31, 1954, he put on his hat, coat and gloves, and jumped from the 10th floor of his apartment to his death.

Our story's "super-villain," Sarnoff, denied that his tactics had any bearing on Armstrong's suicide. He was eventually ousted as chairman of RCA and died in 1971. Lee de Forest, the less prominent "villain," continued his quest for fame as the father of radio and died in 1961. And Marion Armstrong won two of the 21 infringement suits (settling on the rest) that her husband, the hero of our story, had filed a month before his suicide. She died in 1979. 📌



Lee de Forest's Audion (triode) vacuum tube was the first practical amplification device. Pictured is his Type 2Q15 triode, circa 1921. Although he had more than 300 patented inventions, de Forest was often involved in litigation regarding his business ventures.

Jack Lander, a near legend in the inventing community, has been writing for *Inventors Digest* for 22 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.



Handy, Schmandy

HAVING INVENTING TALENT ISN'T CRUCIAL
FOR GETTING YOUR PRODUCT TO MARKET **BY HOWIE BUSCH**

IN AUGUST, I was honored to be a featured speaker at the United States Patent and Trademark Office's annual Invention-Con. But as I stood before hundreds of inventors, I couldn't help but feel guilty.

Although in the past five years I've licensed at least a half-dozen products, launched a successful Kickstarter campaign (and manufactured that product) and appeared on "Shark Tank," I can't make a blasted thing. I knew that everyone in the crowd had more inventing talent than me.

While we're at it, since you're reading this in *Inventors Digest*, you are probably handier than I am, too. But that's not really saying much. Anyone who has ever put together an Ikea desk is handier than I am.

So how is it possible that such an unhandy guy has been able to get so many products to market?

Easier, yet still hard

If you're like most inventors, you're probably good at the inventing part of creating and building something new, making a prototype and tinkering until it's just right. You may even be good at dealing with the requirements of filing a patent, making sure you've got all of the appropriate claims in there, blocking workarounds and getting it all just right.

It's the other stuff about getting products to market that causes most inventors to struggle. For me, it's the opposite.

The good news is that thanks to an internet with Amazon, Etsy, Facebook, Shopify, Open Innovation, Kickstarter and Indiegogo—among many others—it has never been easier to get your product to market. You don't have to rely on a retailer providing you shelf space anymore.

The bad news is that easier still doesn't mean it's easy. It still takes hard work. It takes persistence. It takes getting rejected and staying with it. It takes getting out of your comfort zone and getting out there and networking.

But before you get to any of that, once you come up with your idea and possibly create your prototype you have a decision to make.

Should you manufacture the product yourself? Or are you better off licensing to a company that already manufactures and distributes similar products in exchange for a royalty? Or would you be better off doing a crowdfunding campaign and then deciding whether to continue manufacturing or license from there?

It's essential to make the right choices involving manufacturing by yourself, licensing and crowdfunding.

MANUFACTURING

LICENSING

CROWDFUNDING



Know yourself, options

Because the path to market starts with that decision, let's briefly think through those three options.

1 Manufacturing. Manufacturing a product yourself requires a lot more heavy lifting than licensing, but that also means there's greater potential financial reward. Some of the things to consider are the product itself and the industry.

For example, if your invention is a medical device or a new component for a car, manufacturing may not make sense because it's too costly to develop and you don't have the means for distribution. Dig down deep and make a personal assessment as to whether you're in a position to manufacture. Do you have a full-time job that doesn't give you any time leeway? Are you strapped financially, or does your personality not lend itself to running a business?

2 Licensing. Experts in this arena love to say that licensing is the best path, but it's not so black and white. If you don't have the bandwidth or personality after thinking through the above or if you're in an industry that is more open to licensing, then yes, it may well be the best path for you. Some of the key benefits of licensing are that you have very little financial risk and time investment once it starts selling.

Then again, your potential financial reward isn't as great and you have far less control. I had a product that wasn't nearly as successful as it could be because the manufacturer chose to go with a design, packaging and price that I didn't like. Ultimately, it was the licensor's call.

3 Crowdfunding. I've had a number of inventors tell me they tried crowdfunding and that it doesn't work. When I ask what they did, they say they put up their campaign and no one came to buy. Well, of course—because that's not how you succeed with Kickstarter, Indiegogo or any other crowdfunding campaign.

Much like the other ways of getting to market, you have to do your research and learn that you have to bring people to your campaign—friends, family acquaintances, etc.—and have them buy. Then the algorithm recognizes your product, and you start to see the crowdfunding site's organic traffic contributing as well. But you also have to use paid advertising (Facebook Ads) and unpaid (traditional PR).

If it's important enough to you to get your product to market, you'll be willing to do whatever it takes. That's what I've been willing to do. Once a talented creator/inventor makes that decision, he or she is far ahead of me.

If I can get my products to market, you can, too! 📦

Howie Busch is an inventor, entrepreneur and attorney who helps people get products to market through licensing, manufacturing or crowdfunding. Possibly the world's least handy inventor, he has licensed many products, run a successful Kickstarter campaign and appeared on "Shark Tank."



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Conquering Mount Walmart

VISION, PERSISTENCE DRIVE SERIAL INVENTOR JOHN MACK

BY EDITH G. TOLCHIN

THE FORCE and motivation behind starting and growing a business have always impressed me. As our subject, John Mack says, “This entrepreneurial journey isn’t an overnight instant success. You won’t be sipping Dom Pérignon and pulling up in your Lambo anytime soon. I guarantee that!”

Successfully navigating the mystery of selling to Walmart is an amazing feat. Here are the many interesting triumphs of serial inventor John Mack, and the characteristics it takes to reach one’s goals.

Edith G. Tolchin (EGT): Tell us about your two new, innovative products, the Multi MIT Universal Series glove and the i-Flo “Just Huck It” winter glove. Why are they different from other texting gloves?

John Mack (JM): The difference between my glove and every other glove on the market: The patented Middle, Index and Thumb (MIT) fingers have retracting tips on both gloves that are held back by Velcro tabs. This feature allows the user easy access to their (middle, index and thumb) fingertips for any activity that requires tactile feeling, such as small piece handling or using a touchscreen device without compromising full hand protection. The Universal/Utility glove has a variety of applications: mechanical, tactical, fishing, gardening ... the list goes on!

The Multi MIT Universal Series glove has retracting tips, held back by Velcro tabs, that give the user easy access for any number of activities that require tactile feeling.



The i-Flo winter glove eliminates the days of losing your glove while taking that important selfie on the ski lift. The glove has a separate patented feature that sets it apart from the rest: a two-piece magnet system that connects the glove to a magnet affixed on the zipper of any garment. This allows the user to easily keep track of their gloves upon removal. A small magnet sewn into the wrists of both gloves attaches to a magnet that is affixed on the zipper of a coat or backpack. This feature allows the user to hang the wet, bulky gloves from the zipper of a coat or backpack and ensures the gloves won’t be lost or left behind.

It’s a well-known fact that the texting gloves currently on the market don’t work very well, and it is all too common that the user pulls off the glove to text. My gloves allow the user to perform many different tasks that require the precision of tactile feeling without compromising full hand protection.

EGT: Where do the names come from?

JM: Honestly, Multi MIT was created from a brainstorming session with my girlfriend, and i-Flo was my idea. I-Flo was a name that seemed to encompass my enthusiasm for the action sport lifestyle.

EGT: Please tell us about your background.

JM: I had a business that manufactured and sold a line of antenna figures called “Korrupt Kittens.” They were little plastic stripper dolls that spun around the antenna of a vehicle. This is where I got my feet wet with manufacturing and selling a product. It was my real-world schooling on business. It was great at the time and an incredible learning experience for my current business.

EGT: And your other products?

JM: The Max Rax is a garage rail hanging system that uses the existing garage rails to hang anything you want off the garage floor. They hold 50 lbs., and I currently sell them to Walmart and other retailers. Yes, they are patented.



Multi MIT was created during a brainstorming session Mack had with his girlfriend.

"I packed my bags, loaded my 1984 RV and took off on an extended road trip ... determined to come home with names and orders from Walmart! And you know what? I did!" —JOHN MACK

Another product is a line of all-purpose bags (two styles: canvas tote and nylon gym bag) that have a clear, plastic sleeve on the side or top of the bags where you insert your hand-written goal for the day. The idea is to encourage people to write down their goals and achieve them, because an unwritten goal is just a wish. Reading your written message or goal every time you pick up your bag is a helpful reminder of where you want to go! These bags come with a set of "Daily Goals" pad of paper and can be purchased separately when the pad runs out.

EGT: How and when did you first approach Walmart, and how long have you been supplying Walmart?

JM: When I finished the idea of the unique line of gloves, I realized I had a product that is so versatile that selling to a large retailer made sense. My plan was to start selling in my own backyard, then take off to other states. I did some research, and off I went selling to my local Walmarts—and to my surprise, I was shut down! I was told no. I was told I needed an appointment. I was told I was "doing it wrong."

I sat in my office and felt defeated. I was discussing this with my girlfriend and she said, "When did someone saying no ever stop you? Take a grass-roots effort. Get names of all the managers that are interested and go that route." I

I have never been much of a rule follower, so I packed my bags, loaded my 1984 RV and took off on an extended road trip to visit Walmarts in Utah, Nevada and California. I was determined to come

home with names and orders from Walmart! And you know what? I did!

I began calling store managers, setting up meetings to present my line of gloves. If the store manager feels they will fit into their store or market, they will fill out an item submission form for you. I drove thousands of miles, meeting with store after store to amass a huge amount of these item submission forms.

I have been a supplier for Walmart for four years now, and I still travel from store to store and market to market. Walmart is like no other retailer, and they are outstanding to work with.

EGT: Tell us about your patent process for the two glove products.

JM: I did the working patents myself. I learned that patenting a product is a straightforward process, starting at USPTO.gov. There is a great deal of information on that website that helped me.

EGT: Are you selling these products only to Walmart, or to other retail? On your website?

JM: A large portion of my sales comes from Walmart. However, I am selling to HomeDepot.com, Ace Hardware and True Value.

EGT: How are the products packaged, and who designed your packaging?

JM: I created the packaging specifically to highlight the feature of the gloves. The packaging is a cardboard hand inserted into the glove to showcase

the unique feature of the middle, index and thumb fingers retracted. It looks pretty damn cool.

EGT: Where are you manufacturing?

JM: I manufacture everything in China. I have been importing things from China for 15 years, and it's an ongoing learning process. What I know is to always expect the unexpected. The bottom line is this: You get what you pay for.

EGT: Tell us about your experience with the "Entrepreneur Elevator Pitch" show and what has resulted from it.

JM: It was great experience. The production company is friendly and helpful. I went in prepared and knocked everything out of the park. I secured unlimited funding and advisory roles from some unique people. The show has led me to this interview with *Inventors Digest* and to Entrepreneur Media, who are going to feature an article about my story with Walmart. The more media coverage of what I'm doing brings a larger reach of product awareness of Multi MIT and i-Flo.

EGT: Any advice for novice inventors?

JM: You'd better learn how to be self-taught, develop some grit, grow a set, and develop some huge

self-confidence! This entrepreneurial journey isn't an overnight instant success. You won't be sipping Dom Perignon and pulling up in your Lambo anytime soon. I guarantee that! You will have door after door slammed in your face. You will be told "no" more times than you will be able to count. If you don't have thick skin, you will fold up like a lawn chair. Simply put, Rome wasn't built in a day and neither is a successful business.

EGT: Will you be adding any other products to your line? Anything else?

JM: I am providing a service to help introduce products from other companies to Walmart for a fee. So far, I have had several companies hire me to introduce their products to Walmart. If you have an idea for a product or a finished product, please feel free to reach out to us. ☎

Details: theideaexpertsllc.com

Books by **Edie Tolchin** (egt@edietolchin.com) include "Fanny on Fire" (fannyonfire.com) and "Secrets of Successful Inventing." She has written for *Inventors Digest* since 2000. Edie has owned EGT Global Trading since 1997, assisting inventors with product safety issues and China manufacturing.



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Water-Saving Device Wins U.S. Dyson Award

LIGHTHOUSE IS A ROBOT THAT DETECTS PIPE LEAKS BEFORE THEY CAUSE MAJOR LOSSES

DR. YOU WU has been interested in conserving resources for as long as he can remember, because he has lived it.

“When I grew up in China, my community had one day without power and another day without water every single week,” said the recent doctoral graduate of the Massachusetts Institute of Technology. “The city regulated the supply to all communities to lower the burden on the power grid and water system. I grew up thinking we were good citizens conserving energy and water for the greater good.

“However, when I learned that every day 20 percent of clean water in the world is lost due to leaks while we were making a sacrifice to conserve water, I thought this was wrong and I needed to change it.”

He designed Lighthouse, a low-cost robot that travels through water pipes to proactively find leaks before they become a problem. His solution won the U.S. 2018 James Dyson Award.

According to the American Society of Civil Engineers’ report on America’s infrastructure, leaking pipes lose an estimated 6 billion gallons of clean drinking water per day; 240,000 water main breaks occur each year.

Existing methods of leak detection, such as geophones and acoustic correlators, are inherently flawed because they search for the sound of leaks. These acoustic devices often find leaks that are already losing at least 10 gallons of water per minute, which is twice the flow rate of a typical shower.

According to the American Society of Civil Engineers, leaking pipes in the United States lose an estimated 6 billion gallons of clean drinking water per day.

Dr. You Wu was inspired by efforts to conserve water in his native China.



With its unique tactile sensor, Lighthouse can find leaks when they are losing only 1 gallon of water per minute, identifying leaks before they become catastrophic.

Lighthouse is built from soft, flexible material and uses a special tactile sensor to detect leaks in underground water pipes. A technician inserts the robot into a water pipe through an existing hydrant. As the robot passively flows through a pipe and navigates around pipe elbows, the sensor is tugged by the suction force of a water leak.

When a leak is detected, Lighthouse measures the strength of the tug and records the location of the leak. Once the robot is flushed out of the pipes through a hydrant, the technician can wirelessly download a map of leaks from Lighthouse.

Isis Shiffer, Founder of Spitfire Industries and 2016 international winner of the James Dyson Award, was among the judges for this year's competition. "What attracted me to this design is that even though it's using cutting-edge technology, it's still a very straightforward and simple solution," she said.

The James Dyson Award is an annual international design competition that celebrates young designers' innovation and ingenuity that is open to 27 countries. By winning the national award, Lighthouse receives \$2,500 and advances to the international round of the competition, judged by James Dyson. The international prize is \$40,000 for the student and \$6,000 for his or her university department; international runners-up receive \$6,000 each. Those winners will be announced on October 18.

The two runners-up in the U.S. competition are joining Lighthouse in progressing to the international round, which features 20 projects. They are:

Infinite Cooling, designed by Massachusetts Institute of Technology student Maher Damak, reduces operational costs for power plants and alleviates water stress for nearby communities by recovering large quantities of clean water from cooling tower plumes. Vaporized water droplets from the power plant are zapped with a beam of ions and are collected on wire mesh. The droplets then fall into a temporary reservoir and can either be reused in the power plant or sent to a city's water supply system.

Night Loo, designed by ArtCenter College of Design student Anna Meddaugh, is a portable, personal urinal that allows women and girls living in refugee camps to safely go to the bathroom at night. The petal-like flaps act as a splash guard when open and cover the contents of the urinal when closed.

After relieving herself, the user empties a packet of pre-portioned dissolving PVA film, which turns liquid waste into an odorless powder in less than a minute. The powder is then emptied through a spot that pops out of one end of the device. 📺

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Chris Prendergast's networking efforts led to his getting a prototype, a crowdfunding campaign that raised \$400,000, and the possibility of bringing his product to market by the end of this year.



SCHOOLTEACHER INVENTS WORLD'S FIRST PORTABLE AMP THAT FITS ON THE BASE OF AN ELECTRIC GUITAR **BY REID CREAGER**

HE WAS A YOUNG, respected and well-liked elementary science teacher at Unionville Montessori Private School in Markham, Ontario, Canada. He even was in charge of the science program. But deep down, Chris Prendergast was still the same “Guitar Chris” from his college days.

Prendergast was a part-time electric guitar player in his hometown of Toronto who was carrying two careers and too much gear. “I grew increasingly frustrated that whenever I wanted to play my guitar, I had to lug all of this equipment around and plug it in,” he says.

A defining moment came in 2013, when he wanted to play along with another song in his classroom. To achieve this, he had to buy a pedal to run through his amp and had to download the song he wanted to play along with through his computer, then turn it up loud.

“I remember asking myself if there was a better way,” says Prendergast. “So I started to play around with the idea that this could be possible and started brainstorming.”

In an effort to consolidate his equipment without sacrificing quality sound, Prendergast began experimenting on an old travel guitar. Because of Bluetooth speaker technology and advances in smartphones, the notion of developing a smart speaker attachment was promising. Executing it would be the challenge.

“I wanted to find out if there was room for a speaker on a guitar,” he recalls. He also had to be sure the device was lightweight with a simple design that would be functional and cost effective, as well as fun.

Prendergast used the 3-D printer at his school to create the mounting device. But he was still a full-time teacher who didn’t know anything about raising money or bringing a product to market.

New momentum

A few years later, he saw that a high-end version of his concept raised nearly \$500,000 on Indiegogo. That, and a favorable reaction when he showed off his product at a party, motivated him to resume his quest; he went to a hardware store and bought some electronics to pursue his own proof of concept.

Before long, he had developed the world's first portable amplifier (weighing less than 2 lbs.) that attaches to the base of any standard electric guitar. Via a connection with a smartphone, it allows the user to access multiple different features such as being able to play along with your favorite songs—without the hassle he experienced in front of his students.

Further, his device runs for eight hours on one charge. A spring-loaded system and soft mount protect the guitar; two short cords provide 10 watts of clear sound and numerous effects.

Prendergast said the product's name was the result of a talk with a friend about his invention. "He said,

"This lets you jam on things, and it's stacked on the end of the guitar."

A few days later, the friend suggested the name Jamstack. A trademark search and a legal filing followed.

Prototyping, crowdfunding

Professional contacts advised Prendergast to come up with a prototype, but that was easier said than done.

"A good-looking prototype is expensive," he says. "So that was barrier one. Secondly, there's figuring out the thousand little decisions that you don't have to face when creating a proof of concept, such as button layout, spring force, etc."

"I grew increasingly frustrated that whenever I wanted to play my guitar, I had to lug all of this equipment around and plug it in." —CHRIS PRENDERGAST



CHRIS PRENDERGAST

Age: 31

Home: Toronto, Ontario, Canada

Education: Bachelor of Science from McMaster University, Hamilton, Ontario, Canada

Favorite guitarist: Stevie Ray Vaughn "for his passion"; John Mayer

He got a tip about an industrial design firm, Cortex Design, and struck a deal in which the firm would handle the prototyping at cost if the product had a successful crowdfunding campaign. Enter another key partnership: a well-known crowdfunding manager in Ontario, Khierstyn Ross, who was impressed with Prendergast's product pitch.

The first crowdfunding effort, launched on Kickstarter, ran for 30 days and raised \$90,000 in late 2016. The showing was encouraging, but Prendergast and Ross felt they could do better by making some improvements.

He stayed aggressive, entering pitch contests with strong results. Jamstack won the Startup Launchpad pitch competition at Canadian Music Week in Toronto in April 2017, which yielded connections with some top music investors and a \$10,000 cash prize. Several months later, Prendergast won a spot on the British TV pitch show "Dragons' Den" and secured \$200,000.

The cherry on top was the revamped crowdfunding campaign on Indiegogo, which raised \$400,000.

"It was amazing to see the outpouring," Prendergast says. "We had the money now and were ready to rock and roll!"

He had taken \$12,000 in savings and turned his company a \$1.4 million-dollar business in less than a year.

Amped about the future

With more help from three music-loving investor angels, Prendergast was able to get Jamstack into production. The plan was to start sending the patented product to crowdfunding backers at the end of September, with hopes of availability for the general public in time for the holidays.

Prendergast has no current plans to license his invention, and for now marketing will be mostly through Facebook and Google (with a big help from West & Social, which does the product's marketing videos). Jamstack is only available through its online website, Jamstack.io, although Prendergast hopes to get it on Amazon and other retail sites.

Largely due to the time demands of growing a successful business, Prendergast left teaching last November. "I had only really just begun to get going and kind of hid it for a while, as it can be a big distraction," he says.

Since then, he has run into a few of his former students. "They're always super excited to hear about my progress and usually end up asking about 'Dragons' Den.'" 🎵



NOW HEAR THIS: 5 MORE

True music innovation entails the most creative and useful new instruments for current performers, as well as devices that attract kids and young people who could be future musicians.

Earlier this year, an Anaheim trade show called NAMM (sounds like the guy who sat at the corner of the bar on "Cheers") featured innovations designed to help teach music. By the way, NAMM stands for the National Association of Music Merchants.

The **ONE Piano Hi-Lite** is designed to provide an intuitive way to learn and play piano. A long strip with sensors on the bottom, it goes on top of a piano keyboard and is connected with an app for an iPad or iPhone. Keys light up along the strip as notes appear onscreen.

Also featured at NAMM was **Blipbox**, a synthesizer designed for 3- to 8-year-olds. The instrument has arrow paths on top connecting all the buttons to show the synthesizer's signal chain. However, there are no images or symbols on the Blipbox to tell kids what the buttons do.



One of the most talked-about recently developed instruments is the **Eigenharp**, high-end technology launched in 2009 that presents new ways of performing and manipulating electronic music in live situations. Specifically, it's a multi-functional Musical Instrument Digital Interface (MIDI) controller.

To further explain: The Eigenharp Alpha, the most complete version of the controller, has a matrix of 120 keys that can be assigned to either play notes or trigger other actions. These include a breath controller, a microphone and 12 larger keys for tapping out percussion, such as drum pads. Each key can be set to control pitch, modulation and more.

HAPI steel drums use tongues cut to different sizes and shapes to produce musical tones, similar to wooden tongue drums. HAPI builds on an innovation by Dennis Havlena, who began cutting tongues into steel tanks in 2007.

HAPI drums can be played with your hands or with specially designed mallets, and can be used in your lap. Sound-isolating rubber feet on the drum bottoms allow you to play the drum on any surface.

Did you know that the electric violin dates to the 1930 and 1940s? Now there is an electric, 3-D-printed violin called the **3Dvarius** that was featured at last year's NAMM event.

The 3Dvarius (four-string and five-string) was invented by French violinist Laurent Bernadac, who wanted a small violin in the same shape as a classic Stradivarius that he could travel with and use for stronger rock and jazz. At \$7,000, you may want to wait and see if the price goes down.



A Most Creative Note

ANNUAL GUTHMAN COMPETITION SHOWCASES
UNCONVENTIONAL MUSICAL INSTRUMENTS OF THE FUTURE

This year's honorees included first-place finisher Victor Zappi (below) for his Hyper Drumhead. Others from left: Runner-up Jassie Rios (GramFX), finalist Gustavo Oliveira da Silveira (XT Synth), People's Choice Best Instrument winner Jan Heinke (Stahlcello), third-place finisher Wesley Hicks (Microtonal Ocarina), Most Unusual Instrument winner Matthew Steinke (Stepper Rattle), Best Performance winner Gurpreet Chana (Tablix).

TO OPEN this year's Margaret Guthman New Musical Instrument Competition final concert, emcee Cheryl Rogers walked onstage wearing wraparound sunglasses and bright yellow feathers around her neck as the band played the Georgia Tech fight song. This wasn't going to be a typical invention showcase.

Guthman's niece set the tone for the March 8 event, which College of Design Dean Steven French said featured "some of the most incredible creative inventions you're likely to come across in the next decade."

The Guthman gala, which began in 1998 as a keyboard competition, has blossomed

into an event that attracts a growing range of unconventional instruments and performers worldwide. Gil Weinberg, director of the Center for Music Technology, told *Inventors Digest* that "Presently, the competition welcomes more than 20 semi-finalists every year to exhibit their inventions. Last year, we had applications from 17 different countries over four different continents."

Georgia Tech President Bud Peterson, who has 13 patents, was a fitting choice as one of the speakers. But the inventions spoke the loudest. It wasn't just the unconventional music that came from them; it was the designs of the instruments, some of which are true works of art.

The winning entry was the Hyper Drumhead, created by Victor Zappi and Sidney Fels. It's a



tabletop interface with a retro-projected multi-touch glass display. Per the Guthman website: “An innovative model computes sound waves in real-time. Every time the glass is touched, a sound is injected into the system, turning every part of the screen into its own percussive instrument.”

The second-place GramFX, created by Jassie Rios, is “an augmented gramophone that uses an open-air gesture to control the processing of acoustic and electronic sound. It combines old and new recording/playback technologies to explore the physicality of a wind-up turntable in relation to light, time, space, and movement.”

Finishing third was Wesley Hicks’ Microtonal Ocarina—a collection of ceramic vessel flutes, able to play pitch fluid, tonally and micro-tonally. If this is all hard to envision, go to <https://youtu.be/oCrrNlk4iKY> for the performances.

In the future, Weinberg said the event hopes to receive an even wider range of instruments “from acoustic to digital, robotic to wearable, exploring the latest technologies from VR to—who knows?—maybe even blockchain.” 📱



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AN OCEAN OF STREAMING

It’s contentious and has a spotty history, but it’s hard to argue that music streaming is one of the most impactful innovations for aficionados in the past couple decades.

When Napster enabled cash-thin college students to share MP3 files of their favorite artists in 1999, a revolution took place that remains alive today. The service was quickly associated with ethical and copyright issues that caused Napster to shut down in 2001, by which time it had more than 21 million users.

Still, the notion of downloading recorded music via the internet was here to stay. Apple’s launch of iTunes in 2003 provided a solution in that consumers now had to pay a nominal fee to download copyrighted music. From that came Pandora in 2005, which recommended new music based on a person’s listening history; and later Spotify and SoundCloud, among many others.

In a March 2018 study, Statista.com reported that the most popular U.S. music streaming service was Apple Music, with 49.5 million users. Spotify (47.7 million) was next, followed by Pandora Radio (36.8 million), SoundCloud (34.2 million) and Google Play Music (21.9 million). On September 11, *Billboard* reported that an estimated 51 million people in the United States pay monthly subscriptions for music streaming services, nearly double the number of subscribers at the end of 2016.



OLD FORMAT, NEW SPIN

VINTAGE AND CURRENT REEL-TO-REEL PLAYERS
MAKING (WONDERFUL) NOISE **BY REID CREAGER**

PHONOGRAPH RECORDS have roared back to life in the past decade, with vinyl album sales reaching more than 14 million in 2017—the highest total in 26 years. Yet just five years ago, one audio expert said vinyl’s reputedly warm, fuller sound could not compare to another analog music medium that was all but dead at the time.

After listening to a highly modified TASCAM Pro reel-to-reel deck playing master tapes at a professional-level 15 inches per second, The Absolute Sound reviewer Jonathan Valin said its sound was far superior to the highest-rated turntable-based system ever reviewed by the magazine. His oft-repeated quote: “I have never heard rock ‘n’ roll reproduced more powerfully and realistically in my home or at a show in my entire life.”

Many audiophiles not only agree, they say the same is often true of other musical styles in the format. So it seemed inevitable that reel-to-reel would follow vinyl as part of a general renaissance in analog sound. It’s under way.

State-of-the-art, digital technology, with high-resolution formats like FLAC downloads and SACD discs, has millions of loyal supporters. And rightly so. But the visuals of a reel-to-reel in action and the hands-on nature of threading a tape are a powerful nostalgic draw for older people—and a fascinating discovery for younger ones. The medium’s winding invention history and evolution add to the interest.

Bing Crosby’s influence

Reel-to-reel is of German origin, with noteworthy background accompaniment by Bing Crosby. Its roots are partly American.

The format evolved from magnetic recording, developed by U.S. engineer Oberlin Smith in the late 1870s and demonstrated some 20 years later by Danish engineer Valdemar Poulsen. According to museumofmagneticsoundrecording.org, reel-to-reel functions via a magnetizable medium that moves with a constant speed past a recording head. An electrical signal hits the recording head, starting a magnetization pattern that is similar to the signal. The playback head picks up changes in the magnetic field from the tape and converts it back into an electrical signal.

The format, used in the earliest tape recorders, included the German-British Blattnerphone (1928) that used steel tape and the German Magnetophon a few years later.

Crosby’s interest in reel-to-reel was sparked by a demonstration from audio engineer Jack Mullin at Hollywood’s MGM Studios in 1947. Crosby wanted the recorders to pre-record his radio shows, and became the first American to do so. Mullin was Crosby’s chief engineer when the legendary crooner became the first American performer to master commercial recordings on tape.

Before long, high-speed reel-to-reel recorders were the main recording format used by professional recording studios and music aficionados. For

Reel-to-reel evolved from magnetic recording, developed by U.S. engineer Oberlin Smith in the late 1870s and demonstrated some 20 years later by Danish engineer Valdemar Poulsen.

consumers, the first prerecorded reel-to-reel tapes were introduced in the United States in 1949 and enjoyed strong popularity that peaked in the mid-1960s. After that, newer and much more inexpensive tape formats such as 4-track and 8-track cartridges and cassettes led to prerecorded reel-to-reels all but disappearing from retail stores by the early 1970s. The emergence of digital recording techniques in the late 1980s made reel-to-reel a distant memory, a niche nostalgia piece.

For studio recording purposes, reel-to-reel had a longer lifespan due to its superior sound quality for making master tapes. Digital generally took over in studios as well, although even today some artists such as the Black Keys, Lady Gaga and Ryan Adams prefer analog tape for its generally acknowledged ability to render unrivaled, right-there-in-the-studio sound quality.

Pricey revival

That unique dimension is behind reel-to-reel's recent comeback. Some herald it as "the new vinyl"—an ironic characterization, given that both formats are so old.

In May, Dusseldorf-based Roland Schneider Precision Engineering introduced four Ballfinger reel-to-reel machines that took six years to develop. These shiny mechanical marvels aren't cheap, with a retail price of about \$11,400 for the basic version to about \$28,000 for the high-end model that includes three direct-drive motors, an editing system and walnut side panels.

Similarly, a company called UHA leverages the best of the old and new by almost completely rebuilding vintage TASCAM decks, using the latest technology. According to hometheaterhifi.com, prices start at just under \$10,000 for a playback-only deck.

If you're more into experiencing the actual vintage machines themselves, eBay teems with decks ranging in condition from "as is" to recently serviced, and in quality from low consumer grade to highly professional studio pieces. Many of these decks were made in the 1960s and early '70s.

Know that reel is very much an acquired taste. It can get pricey; a mere brand-name empty take-up reel usually runs in the \$50-\$60 range. Users must beware of "sticky-shed syndrome" in which oxide that sheds from old tapes can damage heads. Tapes are

vulnerable to being demagnetized by something as innocuous as a vacuum cleaner. As for the machines, replacement parts can be hard to come by on some models. Perhaps most important, attention to maintenance and cleaning heads, capstans, etc., is much more hands-on than with other formats. (Do you have to turn over the tape after the first side, as with an album? Not necessarily; many decks have auto-reverse.)

Because of factors such as these, experts are cautiously optimistic about how strong the reel-to-reel comeback will be. Even makers of new machines are hedging their bets; Ballfinger only plans to make 200 machines per year.

Yet Schneider, the machine's designer, put it best: "Digital media is great, but experiencing music is more than just listening to a sound file. It's sensual; it's reels that turn and can be touched. When it comes to audio quality, nothing else in the analog world gets you closer to the experience of being right there in the recording studio than reel-to-reel tape." 🎧

REEL FAB INNOVATORS

Few, if any, popular artists are more known for their innovation than the Beatles, including their experiments with the reel-to-reel recording format. For instance, the last verse of "Rain" includes backwards vocals—reportedly the first use of this technique on

a record. John Lennon claimed this resulted from his being high on marijuana and accidentally threading his rough-mix tape of the song into his reel-to-reel player the wrong way.

Geoff Emerick, who worked as an engineer for Beatles producer George Martin (Emerick is heard saying "Take 2" at the beginning of "Revolution 1" from the white album), noted the group's experiments with reel-to-reel techniques in his book "Here, There and Everywhere":

- In "Yellow Submarine," a technique was used in which stock recordings of marching bands were cut up and then randomly reconfigured and overdubbed onto the song.
- "Strawberry Fields Forever" was actually the combination of two different taped versions of the song, with versions independently altered in speed on the reel-to-reel player.
- "Tomorrow Never Knows" employed multiple reel-to-reel machines located in separate studio rooms and run by individual technicians, played all at once.

On the consumer side, a rare Beatles reel-to-reel recording believed to have been made in 1964 sold in 2008 for a reported \$23,000 at auction.





Most Useful Invention: Toilet Paper?

IN TERMS OF A TARGET MARKET,
IT'S AN ENTREPRENEUR'S DREAM **BY JOHN G. RAU**

BEFORE inventors begin the development process for their new product idea, they should research the market. They must understand who their target market is—hopefully large enough to make the invention profitable.

They also must realize that no matter how much they like their new idea, there is no such thing as a target market that includes everyone. No idea or product appeals to everybody, making the term “must-have” an oxymoron in the inventing context.

When *Time* magazine conducted a survey several years ago to identify the most useful invention ever, the smart phone was the prevailing choice. Still, a survey on smart phone ownership in February by Pew Research Center showed that 77 percent of Americans own one—meaning that almost a quarter of the U.S. public presumably manages just fine without it.

There may be an invention that is even more indispensable, one we take for granted in our daily lives that has been used in various forms for about 1,500 years: toilet paper.

History and evolution

The Chinese are credited as being the first to use sheets of paper for toileting purposes, dating to the 6th century AD. The invention did not become

popular until the 14th century, when the Imperial Court of the Ming Dynasty had it manufactured in 2-foot-by-3-foot sheets, and even perfumed for use by the emperor's family.

Almost 200 years later, the first flushing toilet was invented in 1596 by the British nobleman Sir John Harrington. He invented a valve that when pulled would release the water from the water closet and suggested that flushing should be conducted at least twice a day. Rumor has it that this is where the name the “john” originated.

Paper was a rare commodity until the 17th or 18th centuries; the first reference to paper as toilet paper was recorded in 1718. After the invention of paper, pages from newspapers and magazines such as the Sears catalog and Farmers' Almanac were also commonly used. The Farmers' Almanac actually had a hole in it so that it could be hung on a nail or string.

Because of this extensive history of “prior art,” it no doubt would have been difficult to pass the novelty test to obtain a patent on such a product. But Joseph C. Gayetty is credited with having invented the first packaged toilet paper in the United States in 1857. “Gayetty's Medicated Paper” was sold in packages of flat sheets (500 sheets for \$0.50), medicated with aloe to help cure sores and watermarked with

his name on each sheet. Gayetty's toilet paper was available as late as the 1920s.

Getting on a roll

As indicated by Gayetty's product, initially toilet paper was sold in flat sheets as opposed to on a roll. Somewhere along the way, vendors decided that it would sell better if it could be put on a roll so that it was easier to use and took up less storage space.

In 1871, Seth Wheeler of Albany, New York, was granted patents on rolled and perforated wrapping paper that were the first of their kind in the United States. His Albany Perforated Wrapping Paper Co. became the first to start selling toilet paper on a roll.

Of course, a lot of changes have occurred since with regard to quality, texture and thickness. Soon after Wheeler started his company, others entered the marketplace. The Scott brothers founded the Scott Paper Co. in Philadelphia in 1874; by 1925, it had become the leading toilet paper company in the world and was subsequently acquired by Kimberly Clark. Other companies followed, such as Northern Paper Mills and Charmin Paper Products, with various mergers and acquisitions through the years.

No more spinning

In the early 2000s, inventor Tamara Monosoff observed a potential toilet paper roller problem that needed a solution. A common form of play by toddlers was to unroll the toilet paper from the holder by spinning it, resulting in an unraveled toilet paper mess on the bathroom floor. She invented a product called the TP Saver, a special device that clips onto the toilet paper roll to prevent continuous unrolling.

This is an interesting device from the perspective of defining its target market, because what she found was that small animals—specifically cats—got as much pleasure in manipulating the toilet paper as did toddlers. Thus, pet owners might be a larger market niche than moms who wanted to control toddler messes. The product also works well in boats and RVs, where driving motion and movement causes the roll of paper to unroll. So here is a good example of a new product idea where the focused target market turned out to be smaller than other potential spin-off market niches not initially realized.

A survey conducted by toilet paper manufacturer Charmin showed that the average U.S. citizen uses approximately 57 sheets of toilet paper per day, or 399 sheets per week and approximately 21,000 sheets per year. Based on an average household size of 3-4 persons, this is an annual household consumption on the order of 60,000 to 80,000 sheets.



The Chinese are credited as being the first to use sheets of paper for toileting purposes, dating to the 6th century AD, even though paper was a rare commodity for hundreds of years.

Hundreds of wedding dresses have been made out of toilet paper. In fact, there is an annual competition in New York City for the best wedding dress made from toilet paper.

Toilet paper goes back centuries and is still used daily in spite of all the technology that is available today. Wouldn't this qualify as perhaps the most useful invention ever, one that everyone would want and must have?

Inventor, entrepreneur and philanthropist Richard Branson put all of this in perspective when he said: "If you're embarking around the world in a hot-air balloon, don't forget the toilet paper." 📞

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.





Your 2018 IP Scorecard

SO FAR, TRENDS AND RULINGS SHOW SOME HITS AS WELL AS ERRORS **BY LOUIS CARBONNEAU**

NOW that we are moving into the last quarter of the year, it is a good time to look at some indicators that tend to explain current market trends as well as those heading into 2019. Whenever I search for influencers of the IP marketplace, I generally look for the following clues:

- Noticeable change in the supply and demand chain;
- New case law that may have a long-lasting impact;
- Changes in the regulatory environment;
- Recent large damage awards against infringers;
- Health scorecard of publicly traded IP companies (PICOs);
- Statistical trends regarding patent enforcement and validity.

All of the above are susceptible, especially when taken together, to move the market one way or another. So let's look at those factors so far in 2018 and whether they should affect the market positively or negatively.

Supply/demand: 2018 has been the year that several Fortune 500 companies tip-toed into patent monetization via sales through brokers. On the other hand, many have largely phased out their corporate patent purchase program—in other words, shifting gradually from being buyers to sellers. This does not mean they won't acquire patents, only that they will search moreso for opportunistic reasons as opposed to a budgetary requirement for IP spending. Look also at the bellwether Intellectual Ventures, which went from being the largest acquirer to probably the largest seller of patents. So long as this trend continues, it will remain a buyer's market. This does not mean excellent patents won't sell at a decent value, but it suggests that many patents will not sell at all as buyers can afford to be extremely selective. **Net: Negative.**

Case law: This has been a busy year on the judicial front. Some cases were favorable to patentees, others not so much. Overall, it is a mixed bag. For instance, it is now more difficult to sue in a plaintiff district, but it can lead to larger awards if

you are victorious. And while patentees can still be challenged through inter partes review, patentable subject matter rejections are below 50 percent for the first time in years since the Berkheimer decision in February that was favorable to software patents.

Net: Neutral.

Regulatory outlook: Although most bills that pertain to changing the current patent laws will likely never be adopted, they are a good barometer of the prevailing narrative within the current administration and elected officials. In this regard, the tone has definitely moved from “patent trolls are bad” to “inventors are good.” The next step is to push a more aggressive discourse that “efficient infringers are bad.” If this becomes the new credo, we will find ourselves exactly at the opposite end of the spectrum from where things stood just a little while ago.

Net: Positive.

Damage awards: For the first time in a while, we recently saw several damage awards in excess of \$100 million (many not overturned). Equally important is that the companies on the receiving end of those awards are large operating technology companies that usually fight each case tooth and nail. It will be interesting to see if this changes their attitude toward patent owners. **Net: Positive.**

PICOs: Publicly traded IP companies are the canaries in the coal mine. They are the gladiators of patent litigation (though not by choice) and should normally have a better track record than most patent owners who have to resort to assertion. Yet recent quarterly reports for the most part are not encouraging, with the likes of Acacia, Interdigital, Xperi, Rambus, Immersion, ParkerVision and WiLAN (its big win against Apple came in the third quarter) all down from previous quarters. Only Finjan seems to buck the trend and reported better results, causing it to retain an investment bank and look for a strategic acquirer while it is riding high. **Net: Negative.**



The next step in America's regulatory environment is to push a more aggressive discourse that "efficient infringers are bad."

Stats on invalidation: As everyone knows, one of the largest contributors to lower patent valuations has been the relative ease by which one can challenge the validity of a patent in the U.S.—namely via the Patent Trial and Appeal Board (mostly based on the presence of prior art) or by alleging in court that it does not cover patentable subject matter (2014's *Alice Corp.* verdict). The fact that in the second quarter Alice rejections dipped below the 50 percent mark for the first time is big news. As for inter partes review rejection rates, they are inching down as well—though too slowly to make an impact yet. This should change soon, though, because the Supreme Court's April decision in *SAS Institute v. Iancu* makes those challenges riskier and, very soon, more expensive. A couple of recent cases (see below) will also create some restrictions to petitioners who want to file an IPR, while proposed rules by the United States Patent and Trademark Office to reconcile the burden of proof used in court should eventually work its way in and reduce the rejection rate of issued patent claims. **Net: Positive.**

Many of the factors above have a direct impact on business decisions made when confronted with a request to take a patent license. Who wants to pay a \$1 million licensing fee if the odds of invalidating

a given patent are 75 percent and the cost hovers around \$250,000? Simple math. So, anything that makes the alternative more expensive should make a transaction more likely, assuming rational actors.

A lot of the developments so far in 2018 should contribute to making challenges to patents less certain and more expensive. Also, many plaintiffs are now exporting their assertion campaigns to China and Germany, where they are completely immune to those challenges. This further increases the cost of litigation for the defendant, without the same tools at his or her disposal to stall a case or rapidly make it disappear.

Therefore, in view of the above, it is fair to say that although competing forces will continue offsetting one another, there is probably more positive than negative news if you are a patent owner. It does not mean by any measure that we are back to the heyday of 2012, but as the patent inventory trickles down gradually, the other factors at play should help patent transactions and values inch up steadily.

I encourage those who want to stay abreast of the market on a more daily basis to follow my posts on LinkedIn or Twitter. I also commend the excellent work that Patent Investor does to go in-depth on a lot of what is happening in this world. Check it out!



Buyers and sellers

Recent records disclose **Seiko Epson**'s largest-ever patent divestment. The Japanese firm transferred nearly 2,000 patents in total to entities linked with Longitude Licensing in a series of assignments dating to last December. Assignment records also reveal that Google's parent **Alphabet** assigned 139 patents it had acquired through Motorola to China-based **Amperex Technology Limited** (ATL), a Hong Kong-based maker of lithium-ion batteries.

Non-practicing entity **Dominion Harbor** keeps acquiring patents from various sources that include **Intellectual Ventures** and, more recently, Canadian NPE **WiLAN**. (A non-practicing entity is a person or company holding a patent for a product or process, but with no intention of developing it.) These transactions reflect the change of business strategy of the latter that are either divesting their portfolio (IV) or diversifying their activities (WiLAN's **Quarterhill**). Interestingly, Quarterhill in parallel has recently acquired patents from both **MagnaChip** and **Panasonic**, while Texas-based NPE **LongHorn IP** recently picked up patents from Japan-based Sharp. Also, China-based **Xiaomi** recently acquired more than 350 patents from **Philips**.

Finally, it appears that **Fortress** has taken over the monetization efforts of NPE **Uniloc**. At the same time, Fortress announced a \$400 million new fund directed at patent assertion.

Winners and losers

Recent uncontested winners were WiLAN, IBM and Cisco, respectively. All emerged victorious from a lawsuit against infringers and raked in significant awards on their way out.

WiLAN won a \$145 million damages award against **Apple**, in a case that backfired on the iPhone maker that had initiated the suit by filing a motion for declaratory judgment that the WiLAN patents were invalid and non-infringed. During the trial, Apple's attempt to paint WiLAN as a soulless patent troll found no sympathetic audience, confirming again that the patent troll myth is now on life support. It was a bad argument to start with, as the very patents that WiLAN asserted had been developed in-house as part of its own research and development efforts (not that it should make any difference). This continues Apple's bad streak in 2018 and should increase pressure on its management to revisit its perceived "scorched-earth" policy when it comes to defending patent claims.

IBM rarely sues for patent infringement. When it does, it expects to win. **Groupon** found this to its demise and will now have to pay IBM \$83 million for having encroached upon Big Blue's patents.

The biggest winner, though, was **Cisco** after **Arista** agreed to pay \$400 million to Cisco to settle all pending district court and U.S. International Trade Commission litigation between the parties. ...

There was also an interesting case (and huge award of \$315 million) against **Scientific Games Corp.**, which was accused by **Shuffle Tech** and three other companies of initiating sham litigation to assert invalid patents and keep its automatic card-shuffler competition out of the market. The countersuit was based on antitrust grounds—i.e., that the suit amounted to an abuse of monopoly power. The court agreed, and the judge went so far as trebling the damages initially awarded by jury. This is a great example that the court system is perfectly capable of singling out "bad actors" using their patents to support specious claims. Thus, there is no need for sweeping "reform" to water down patent rights of other patent owners who innovated directly, or those who rewarded such innovation by acquiring their patents. ...

Finally, **Intellectual Ventures**, which has been almost completely dismantled and is selling large blocks of its own portfolio that included a recent sale to an Indian tribe, suffered another blow in court when an International Trade Commission judge called into question its ability to get an injunction against several car manufacturers and industry suppliers in what is a key case in the firm's attempts to license much of the sector. Of all NPEs that we have been tracking over the years, IV must have the



HANDSHAKES

Several current or potential litigants decided to bury the hatchet and go camping instead. Publicly traded **Rambus** announced that **Socionext** signed a patent license agreement. Under the terms of the agreement, Rambus will license Socionext a broad range of innovations related to memory controller and security technologies. ...

TIVO, which makes a point to let everyone know that it is exploring strategic options, reported that it renewed its IP license with **Altice Portugal** for an amount in line with its EMEA (Europe Middle East and Africa) licensing rates. ... **Blackbird Technologies LLC**, a Boston patent litigation company founded by former WilmerHale and Kirkland & Ellis LLP partners, announced it settled a patent dispute with **Lenovo** over whether the Chinese telecom company infringed a computer display patent. ...

Finally, **Qualcomm** notched a victory in its effort to preserve its patent-licensing business, reaching a settlement with the Taiwanese government that revokes a previous finding against the chip maker and saved the company nearly \$700 million in fines. This should help put some balm on Qualcomm's wounds; it recently had to call off its merger with Netherlands-based **NXP** due to the Chinese government dragging its feet to approve the transaction, and pay a \$2 billion break-up fee to NXP.

worst track record before the courts. No one knows whether this is because of poor patent quality, poor representation, or both.

From the bench

The U.S. Court of Appeals for the Federal Circuit ruled three indexing software patents are invalid for claiming nothing more than an abstract idea, upholding a ruling from a judge in the Eastern District of Texas. This is interesting in that the court did not seem to follow its own recent precedent in *Berkheimer*, in which it suggested that *Alice*-related arguments (i.e., whether an invention is claiming patentable subject matter) should be left to trial.

In another case, the same court decided that patent suits that are voluntarily dismissed trigger the one-year window for filing an inter partes review petition. This should increase pressure on accused infringers to challenge patents and may restrict settlement options if an alleged infringer knows that the clock is ticking.

Around the world

Japan recently stole the show on the international front by reporting a record surplus of IP trade, partly fueled by its pharmaceutical licensing activities. It is interesting to see how it has managed to stay outside the current tariff wars (mostly caused by the U.S. perception of an unfair trade deficit with other countries) while performing so well. It might not last. ... Japan's patent office also announced its intention to extend its design patent protection from 20 to 25 years. The policy change has a dual aim of making Japanese companies more brand-conscious and enhancing coverage for innovations that combine visual and technical features, such as user interfaces. ...

Meanwhile, it was reported that **Germany** now accounts for two-thirds of all patent litigation in Europe. The two main factors for this are the fact that besides being the largest European economy, Germany's patent system allows a patent owner to obtain an injunctive relief in case a patent is found to be infringed, even if the court has not yet adjudicated upon its validity. This is exactly the reverse of what we now have in the United States. ...

Finally, a new study is trying to dispel the myth that what Chinese patents lack in quality they make up for in sheer number, and that patent quality should not be underestimated.

On the legislative front

The **USPTO** took advantage of the summer lull to sneak in some proposed significant fee hikes,

I'LL SEE YOU IN COURT



Among the slew of new lawsuits in the United States, **3M** filed a patent infringement action in federal district court against South Korea-based **Tovis Co. Ltd.** (and its subsidiary Tovis North America) and **Scientific Games Corp.** over metal mesh conductor technology used in touch screens. ... The battle between **USAA** and **Wells Fargo** ratcheted up with a second suit by USAA and a counter lawsuit by the banking giant. ... In what could be a sequel to the Supreme Court's decision earlier this year in *Oil States*, audio device maker **Advanced Audio Devices** urged the high court to consider whether patent claims canceled in America Invents Act reviews are regulatory takings by the government, such that patent owners are owed compensation on constitutional grounds (particularly those whose patents were filed or issued before the act was passed in 2011).

including what would mean a 525 percent increase in the fee for maintaining a patent if paid during the so-called maintenance-fee grace period. In parallel, it has proposed levying annual fees on all registered patent attorneys, which could vary depending on whether a person has taken continuing legal education during the year. ... Finally, the USPTO plans a 25 percent fee hike for petitioners who file an inter partes review before the PTAB, apparently due to the added work that the recent Supreme Court decision in *SAS* is forcing upon it. Let's hope this new money will help pay to invest for better servers, since the USPTO recently suffered a five-day catastrophic outage that had applicants resorting to fax machines to get their filings in! ...

If anyone needs proof that the pro-inventor lobby has found its voice after years of remaining largely silent, the **Alliance of U.S. Startups and Inventors for Jobs**—a coalition of more than 30 start-ups and affiliated executives, inventors and investors who depend on stable and reliable patent protection to protect their businesses and investments—asked the U.S. Federal Trade Commission to rein in the predatory and unfair trade practices of large companies that use their market power to acquire new technologies invented and patented by third parties and systematically and intentionally infringe patents and refuse to pay for a license (aka as “efficient infringers”). This would have been unthinkable even a year ago. 📌

Louis Carbonneau is the founder & CEO of Tangible IP, a leading IP strategic advisory and patent brokerage firm, with more than 2,500 patents sold. He is also an attorney who has been voted as one of the world's leading IP strategists for the past seven years. He writes a regular column read by more than 12,000 IP professionals.



Adding IoT to Your Prototypes

THESE 5 METHODS CAN REDUCE INTIMIDATION AND COMPLICATIONS **BY JEREMY LOSAW**

ASIOT DEVICES capture the imagination and dollars of consumers, inventors are increasingly adding connected technology to their innovations. But the latter can be intimidating with so many different wireless protocols and microchips, not to mention the need for apps to show data or interact with the device.

To help simplify the main components of a connected device, think about IoT products as a triple-decker sandwich.

The top is the application layer, which is the deployed device and associated hardware. The bottom is the perception layer; this is how data or controls are viewed, typically in the form of an app. The middle that connects the two is the network layer, which is how data are transferred between them.

For an IoT device to function, all three layers must work together. Fortunately, the technology has matured, so it can be easy to add a device to the Internet of Things and control it with an app.

Five ways to add IoT technology to your prototypes:

Nordic Thingy

One of the easiest ways to add connectivity to a prototype is via the Nordic Thingy. Nordic, one of the world's leading manufacturers of Bluetooth chips, created the Thingy as a showcase of its technology.

The Thingy, 60mm square, includes a number of sensors: temperature, humidity, pressure, air quality color and light, and a 9-axis motion sensor. It also has a microphone, speaker and RGB LED.

The free app allows visualization and control of the device without writing a line of code. Although the board may be slightly too big to fit into small consumer goods, the technology is awesome for use in proof-of-concept prototypes.

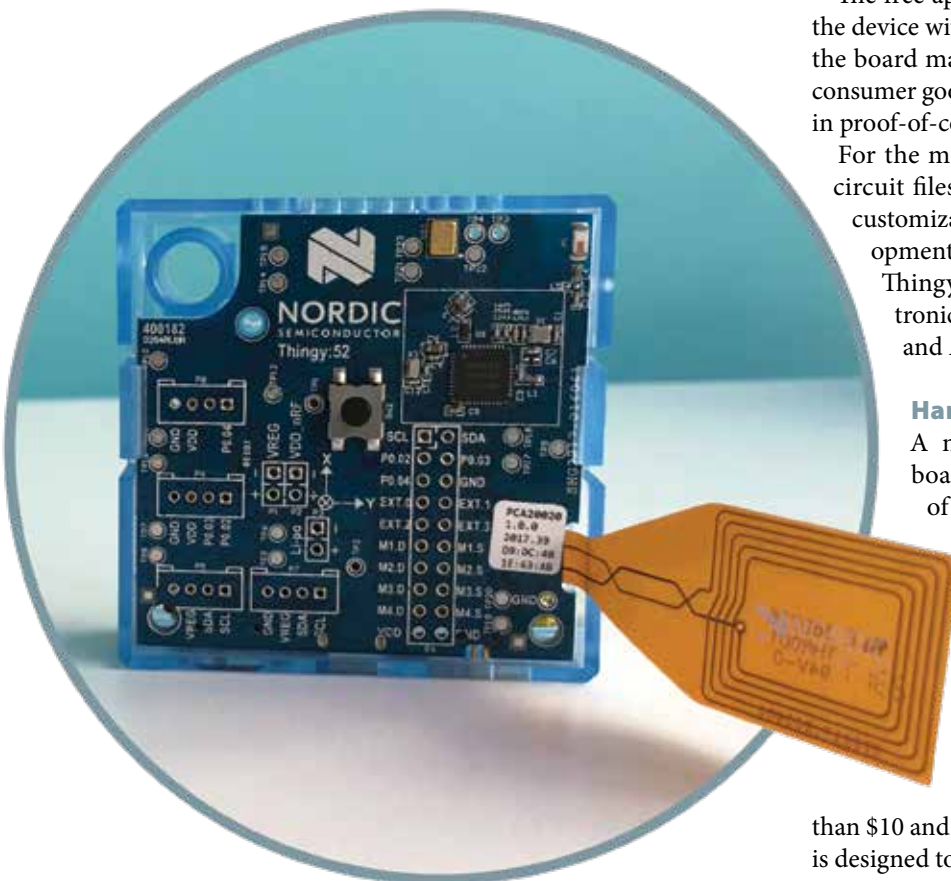
For the more tech savvy, the source code and circuit files are open and free to download for customization. There is an SDK (software development kit) to create custom programs. The Thingy is available for about \$40 from electronics warehouses such as Digikey, Mouser and Arrow.

Hardware development boards

A number of hardware development boards are easy to deploy with a little bit of coding. My favorite is the ESP8266, which is a WiFi-enabled board that is inexpensive and easy to set up. It can be programmed with the Arduino IDE (integrated development environment), and most Arduino libraries are compatible with it.

Electronics supplier Adafruit has a breakout board for the 8266 for less than \$10 and a version called the Huzzah, which is designed to fit the Feather pinout system for easy

The Nordic Thingy is an easy way to add connectivity to a prototype.



integration of displays, relays and other peripherals for less than \$20. Adafruit also has many great tutorials and sample code to help get your device connected to the cloud.

My other favorite development board is the Particle Photon. It is also a WiFi-enabled board but has some slight differences. The photons can be flashed wirelessly through Particle's web-based integrated development environment (IDE), so there is no need for a USB cord and they can be programmed remotely. Particle also has a pre-built console in which events and data can be written to the web without setting up any back-end services. The programming is C++ based and is easy to navigate for anyone who has experience with Arduino.

Backends and dashboards

Storing and visualizing data is what makes IoT technology so powerful, with many back-end and dashboard services to help.

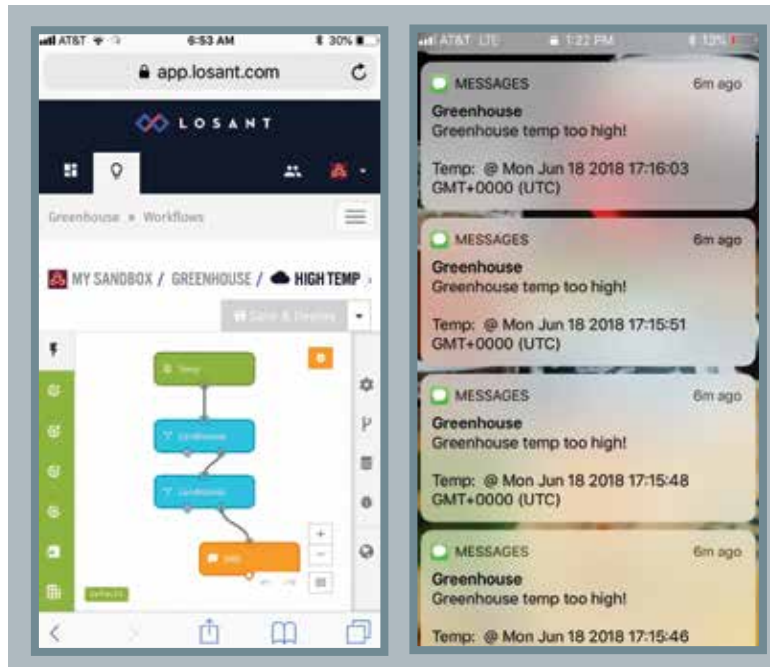
Adafruit.io, one of the fastest to get set up and use, is great for prototypes. Data feeds and dashboards to display them are easy to set up, looking good on mobile devices. There is a lot of sample code, and the free version gives you 10 data feeds, five dashboards, 30 data points per minute and 30 days of data storage.

If you need some more control over your dashboard or advanced features, consider a more sophisticated back-end such as Losant. It has a free account that allows you to set up multiple feeds just like Adafruit.io; however, it gives you much more control. Losant has workflows that allow you to write your own commands based on incoming data. This lets you easily create SMS and other notifications or perform more advanced data analysis..

Blynk

This is an app that allows you to build your own app to control most popular development boards. Simply flash the dev board with the Blynk library, your app tokens, network credentials and the very simple code, and you are ready to create.

Blynk has a number of widgets that can be dragged into the app, such as buttons, sliders, LEDs, maps, RGB picker and many more to create a customized control for your board. Pins on the development board can be configured and controlled inside the app, which eliminates the need to develop custom code for the development board for many projects.



The app is free to download, and you get 2,000 energy points that you can use to add widgets; additional energy can be purchased. The app supports 70 different development boards and supports data transport via ethernet, WiFi, USB, GSM, Bluetooth and BLE.

Blynk can also scale with your product. The free app supports up to 20 devices, with paid plans available that support unlimited devices, customization of the look of the app, and publishing on app stores.

App design software

Designing an app can be daunting, but there are tools that will help you lay out the vision for the features of your app and what it will look like. An easy way to mock up an app and create a flow diagram (called wireframes) is to use the website draw.io.

The site offers templates for the shape of different brands of smartphones as well as libraries of stylized icons. Files can be downloaded to save and can be dragged back into the environment when you want to continue work on them later.

Another option is the recently released Adobe XD, which helps to quickly and beautifully design app and web interfaces.

The platform has the feel and some of the tools of Adobe Photoshop but with the added functionality needed to develop UX/UI interfaces. You can create app and web pages quickly and design how the click-through functionality will work. Then when you are ready to prototype, you can upload the design to the cloud and allow users to experience it via the Adobe XD app. 📱

Losant has a built-in workflow program that allows you to write your own commands based on incoming data.



New Leadership Coming to PTAB

USPTO OPENS SEARCH AFTER CHIEF JUDGE STEPS DOWN

BY GENE QUINN

RECENTLY had an exclusive, on-the-record conversation with United States Patent and Trademark Office Director Andrei Iancu and Office of Enrollment and Discipline Director Will Covey. We spoke about the office's proposal to implement annual dues for patent practitioners, encourage patent-related continuing legal education, and a rather broad-based conversation about the role the Office of Enrollment and Discipline plays in policing the industry.

At the end of that conversation, which was the agreed-upon topic of conversation for the day, Director Iancu indulged me by going off-topic to answer several questions relating to the Patent Trial and Appeal Board and patent eligibility. Specifically,

12 days before our August 27 interview, it was announced that PTAB Chief Judge David Ruschke was stepping down and assuming new responsibilities associated with the director's initiative to better coordinate patent examination operations

and guidelines with PTAB decision making, and vice-versa. He was named senior adviser to patents.

What follows is the brief conclusion to my exclusive interview with Director Iancu.

Gene Quinn (GQ): I would be remiss having you on the record and not at least mentioning the most recent changes at the PTAB. Chief Ruschke has stepped down or left. I'll let you characterize it however you think is factually the most correct, but there's a change at the top. Open-ended question. What does that mean, and do you know who might replace him? Where are you in that process?

Andrei Iancu (AI): Chief Judge Ruschke, he hasn't left the PTO, obviously. He will be in a new role at the PTO addressing an important issue for the office, which is the coordination between the PTAB and the overall patents organization. Sometimes there is a gap between the two organizations that we would like to bridge, or at least minimize. He will take on that role and study that issue and try to make suggestions on how to improve it. I do think it's an important



Scott Boalick (left) will be acting chief judge. Jackie Bonilla will be acting deputy chief judge.

function to address. And at the PTAB, we will have new leadership. For now, come September 2nd, the acting chief will be Scott Boalick, and the acting deputy chief will be Jackie Bonilla.

We're going to post the position, the vacancy. I want to encourage everybody out there, both inside the PTO and from the outside, who is interested, and thinks will do an excellent job, to apply. We are at the beginning of the process for finding new leadership at the PTAB.

GQ: OK. I guess the last thing that comes to mind relates to 101 (the U.S. patent code section on subject-matter eligibility). I guess it was earlier this month ... you had hinted that there was going to be some fresh 101 guidance. I'll let you characterize it. I have in my mind it was in weeks or months, but sometime soon.

AI: Yes. I think that is our goal, (that in) the next several months we should be able to put out broader-based guidance to address the process of the 101 analysis that our examiners do. As I've said publicly many times, it is obviously a very complex issue. There's a lot of case law that's involved and we need to be mindful of, and we just want to make sure we're doing the right thing.

We're looking at that, and we're working very hard on 101. I am hoping that we can get something out in the next several months. Can't promise for sure because it is so complex—and we just need to make sure that it is actually doable, in fact—but we are working with that kind of a time frame in mind to come to a particular view one way or another.

GQ: Are you thinking about that being a federal register notice, or is that more like a memo from Bob Bahr (deputy commissioner for patent examination policy) to the examiners, or is it like a PowerPoint training guidance—or is it maybe all of the above?

AI: It's at least several of the above. We haven't figured all that out yet, but at the minimum it would be guidance to the examiners in combination with training,



Robert Bahr, deputy commissioner for patent examination policy, and the oft-referenced Berkheimer memo.

for sure. In many of these situations, we also put it out for public comment in the federal register. We did that, for example, with what's come to be known as the Berkheimer memo.

(Editor's note: The Berkheimer memorandum, issued by the USPTO in April, came in the wake of a ruling by the U.S. Court of Appeals for the Federal Circuit in *Berkheimer v. HP* in February. It says that a USPTO examiner is now obliged to factually prove that any "additional features" of a claim are well understood, routine, and conventional in order to support an "abstract idea" rejection. In short, it's good news for those applying for software patents.)

GQ: Yes. You mentioned that ... I think you called it the so-called Berkheimer memo. Are you uncomfortable with that being called that?

AI: No, it's just a name, but ...

GQ: Because that is what it's called.

AI: That's what some people call it. Just calling it that would suggest that we're tracking specifically a particular case. We are definitely ... that particular memo does address the Berkheimer case but goes into further explanation specifically for our agency. ☎

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.





Marilyn Monroe

Copyright Case Moves to Trial

JUDGE RULES IN FAVOR OF PHOTOGRAPHER'S TRUST
OVER 'LAST SITTING' PICTURES **BY STEVE BRACHMANN**

THE CASE involving the disputed ownership of iconic Marilyn Monroe “Last Sitting” photographs in 1962 will continue to move toward a trial, now that U.S. District Judge Paul Engelmayer of the Southern District of New York has determined that the owner of the photo copyrights is the trust of the late photographer who took the pictures and not former *Vogue* magazine publisher Condé Nast Inc.

This case revolves around the sale of modified and unmodified Last Sitting photographs by twin sisters Lisa and Lynette Lavender. They began working in 2002 for Bert Stern, the photographer who captured the 2,751 images of Monroe just two months before her death. Stern captured the images over the course of three photo shoots, with the intent that the photos would be published in *Vogue*.

Starting in 2010, Stern approved of the Lavenders’ creation of jeweled prints of Last Sitting photos and the prints were sold under an agreement that split the profits 50-50 between Stern and the Lavenders. The Lavenders then sold both jeweled and unmodified prints online through eBay and Amazon. Although Stern was aware of these sales and did not pursue legal action up to his death in 2013, his

widow, Shannah Laumeister Stern, filed suit against the Lavenders over those sales in December 2016.

The Lavenders contended that the photographs were “works for hire” produced for Condé Nast, using Stern’s first-person account of the photo shoots from the 1982 book “The Last Sitting”—the sole piece of evidence entered by the Lavenders to argue that Condé Nast was the owner of the copyrights to these images. Stern had registered copyrights for 100 of the photos in 1982 and then all of the photos in the collection in 2013.

Condé Nast had never pursued an ownership claim and repeatedly obtained licenses from Stern to republish the works. Despite this, the Lavenders argued that the photos were created at Condé Nast’s “instance and expense,” making them works for hire under the 1909 Copyright Act.

Explaining the ruling

In analyzing the Lavenders’ work-for-hire claim, which would render Condé Nast as the only entity capable of pursuing copyright claims against them, Judge Engelmayer noted that Stern’s copyright registrations gave rise to a rebuttable presumption of his ownership of copyright to the photos. By focusing only on the second and third photo sessions with Monroe, which Stern’s written account notes were arranged at *Vogue*’s request and involved certain expenses for *Vogue*, “one can extract aspects of Stern’s narrative to support a work-for-hire theory,” Judge Engelmayer wrote. However, in analyzing the “instance” element, Stern’s narrative shows that the idea to photograph Monroe was his, not *Vogue*’s. As for the “expense” element, the record is inconclusive as to which party purchased champagne for the second shoot and Stern noted that the photos were developed in his own darkroom.

Further, although Stern’s narrative concedes that there was a contract between *Vogue* and himself for producing photographs for publication, there was nothing conclusive offered regarding whether that agreement reserved copyright to either *Vogue* or Stern. “Under these circumstances, assigning dispositive

Lisa and Lynette Lavender, who worked as assistants to photographer Bert Stern, contended that the photographs were “works for hire.”



Bert Stern captured 2,751 images of Marilyn Monroe just two months before her death, over the course of three photo shoots.

significance to Stern's narrative would accent an historical accident: that, today, 56 years after the events at issue, Stern's account alone survives," Judge Engelmayer wrote. "All other direct evidence bearing on copyright ownership has been lost to history."

The Lavenders had also cited correspondence from Condé Nast sent in 1998, 2014 and 2017 in which outside counsel for Condé Nast reserved the right to claim that the Last Sitting photos were works for hire. The court, however, found that this evidence was inadmissible on the ownership issue. For example, the 1998 letter noted that it was possible Condé Nast was the copyright owner based on the absence of the contract discussed by Stern in his 1982 narrative—but this was merely an assertion of a legal position based on a review of materials, not a fact that was dispositive on the issue of ownership.

Alan Behr, partner at Phillips Nizer and lead counsel representing the Stern trust, commented on Judge Engelmayer's opinion on copyright ownership: "This is an important victory for holders to rights to legacy photographs. The record may not have been as complete as everyone would have hoped, so the court gave great weight to the value of creation and the creative act. It's incumbent upon those who would take those rights from that person to have a clear basis for doing so, but a clear grant of ownership was not established in this case. This decision will help in the future when people have to go through

the question of these legacy works where ownership has been challenged or disputed."

Partial victory

Although the court determined that Stern was the lawful copyright owner, Judge Engelmayer did find that the online posting of copyright-protected images of the photos being sold would be fair use if the Lavenders can prove at trial that the photos were gifted to them by Stern. Niall MacGiollabhui, counsel representing the Lavenders, said that "While my clients respectfully disagree with Judge Engelmayer's decision as to copyright ownership, they are very pleased with his 'fair use' ruling concerning their online sale of Bert Stern prints, which were given to them by Stern over the course of their decades-long relationship.

"This ruling is highly significant, not just for my clients but for online sales of copyright-protected works in general. They now look forward to full vindication at trial." 📱



PHOTO BY IRVING PENN

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.



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theabcshow.com

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globalgamingexpo.com

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IoT Corner

High-end beauty and health care brand FOREO recently launched an AI-enabled smart facial cleansing device, the **LUNA fofo**. It uses gold-plated skin sensors to analyze your skin's moisture levels and utilizes that data to adjust the power, frequency and duration of its vibratory cleaning.



The device is powered by artificial intelligence that learns your skin's patterns over time to deliver a custom cleaning. Custom app profiles are provided via the FOREO app.

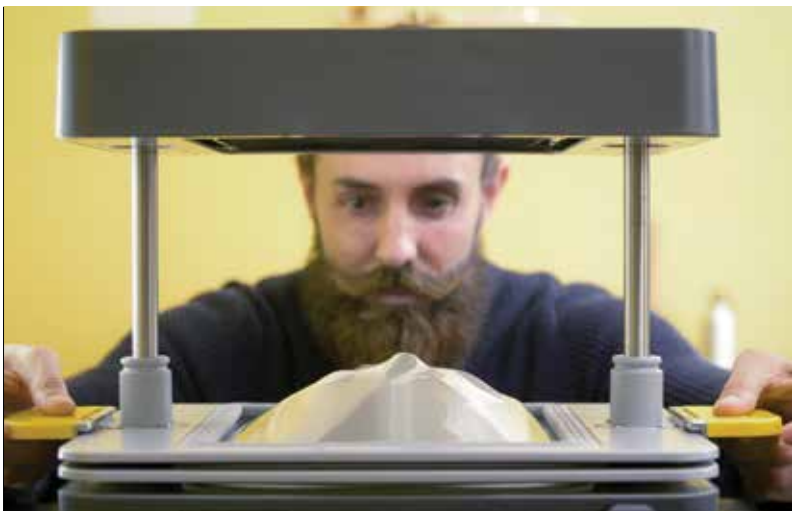
The waterproof silicone design features super-soft molded bristles that are common on most of the company's products, including its flagship product the ISSA toothbrush.

—Jeremy Losaw

Wunderkinds

Frank Epperson was 11 in 1905 when he invented what became the Popsicle. Last year **Sophie Broderick**, a 10-year-old from Connecticut, updated the concept to help her grandmother who was undergoing treatment for cancer. Fudgsicles helped soothe her

grandma's mouth sores that are a common side effect of chemotherapy, but Sophie came up with something more nutritional. Using fruit and protein powder, she created the Chemo Thera Pop. "It has a ton of fruit in it, it's very nutritious, but it doesn't taste gross," she told the Rhode Island-based Westerly Sun. It also has 10 grams of protein to help protect against weight loss.



What IS that?

It's your own tabletop factory! Or so say the makers of the **FormBox**, which makes molds of almost anything. It works with any vacuum cleaner "to instantly create a mold that picks up texture finer than a grain of sand." This can be especially helpful for those wanting to start a business at home. The FormBox's most recent video had 21 million views on Business Insider.

46%

The percentage of **patents granted to American companies** last year, most in the world. Asian companies accounted for 31 percent of patents, European countries 15 percent.



WHAT DO YOU KNOW?

1 Leo Hirschfield's invention of the Tootsie Roll in 1896 was named after his:

- A) Daughter
- B) Wife
- C) Parakeet
- D) None of the above

2 **True or false:** President Barack Obama signed only three patents during his eight years in office.

3 According to a 24/7 Wall St. ranking earlier this year, what is the world's most innovative company based on the most patents granted in 2017—IBM, or Samsung?

4 Harry Burnett Reese, inventor of the Reese's Peanut Butter Cup in 1928 that is high on many lists as America's favorite Halloween candy, once worked on a dairy farm owned by which chocolate maker?

- A) Fred Sanders
- B) Milton Hershey
- C) Henri Nestlé
- D) None of the above

5 **True or false:** Once a trademark is registered, it's valid in any country in the world.

ANSWERS: 1. A. It was named after Hirschfield's 5-year-old daughter, Clara. 2. False. He signed none. When Donald Trump signed the 10 millionth patent earlier this year, he was the first president since Jimmy Carter in 1976 to sign one. 3. IBM ranked No. 1, with 9,043 patent grants last year, 149 more than Samsung. 4. B. Reese worked on Hershey's Pennsylvania farm in part because he needed the money; he had 16 children. 5. False. With few exceptions, trademarks are not valid beyond national borders.

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