

# Inventors

OCTOBER 2016 Volume 32 Issue 10

DIGEST

## Halloween Innovated

THE CREEPY, THE CREATIVE, THE COOL

### OUIJA ORIGINS

THE TRICK TO GETTING A PATENT

### FARM-FRESH IDEA

GRAVEL SPREADER CATCHES ON

### PLASTIC POWER

HOW IT'S MOLDED,  
HOW MUCH YOU PAY



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## Time to Be Creative, And Time to Savor It

Who invented Halloween? Most sources attribute its roots to the ancient, pre-Christian Celtic festival of Samhain that was celebrated on the night of Oct. 31. (Why do I suddenly sound like Cliff Clavin?) The Celts lived about 2,000 years ago in the area now known as Ireland, the United Kingdom and northern France. They believed the dead returned to Earth on Samhain, with people gathering to light bonfires, offer sacrifices and pay homage to the deceased.

Trick-or-treating has only been around for almost 100 years in North America. For many families with children, trick-or-treating and creating a costume are the highlight of Halloween—as they are for Carrie Boyd's family.

The art director at *Inventors Digest*, Carrie excitedly and relentlessly pursued the most creative and chilling Halloween innovation photos for our eight-page spread this month (no store-bought Halloween masks and costumes here), even taking some herself. She also designed the creatively fun "idea" cover. Photoshop artist Jorge Zegarra helps with the artfully designed elements that Carrie oversees and executes in every issue of ID with exacting and uncompromised standards.

Her Halloween energy also shows in delightfully unconventional family costumes that have become particularly meaningful in recent years. "The wife of one of my husband's co-workers was diagnosed with Stage 4 colon cancer when her second child was born in 2005," Carrie says. "They told her she had around six months to live. That October, her husband threw her an elaborate Halloween party with family and friends that would become a tradition to celebrate each year she survived her diagnosis. She made it five years!

"Our family looked forward to this every year. We miss her a lot. We actually won the costume contest the last two years." Again, no store-bought Halloween masks and costumes here: "Our favorite was when my husband, Stephen, and I went as a dirty clothes hamper and washing machine (left). We had a lot of fun building that costume."

So now more than ever, Carrie and her husband appreciate this time of year. "We don't take for granted the years we have with our kids (Audrey, 10, and Carter, 8)," she says. "We cherish the time with

our kids more because we remember our friend isn't able to be with her family. We carry on her memory and excitement for the event going forward."

Here's to inventing new memories for All Hallows' Eve, and savoring the memories we've created.

—Reid



# INGENUITY IS AMERICA'S MOST VALUABLE RESOURCE.

**DON'T TREAT IT LIKE A CHEAP COMMODITY.**

America has been on the cutting edge of innovation for over 200 years because of a strong patent system. If Congress passes harmful patent legislation, it will devalue the system that has helped turn America's best thinking into our nation's #1 export. That will mean fewer new ideas brought to market, fewer jobs and a weaker economy. We can't maintain our global competitive edge by undercutting our greatest asset.

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# Contents

October 2016 Volume 32 Issue 10



12



18

## Features

### 24 **Tricked-Out Inventions**

The Creepy, Creative, Cool From Halloween-Themed Companies

## American Inventors

### 16 **Finally, a Clean Public Bathroom Break**

The Restroom Kit Provides Portable Hygiene in a Small Pack

### 18 **Simply Innovative**

Farmer's Gravel Spreader Improves Safety, Saves Time

### 22 **Teen Invents for Seniors**

17-year-old Creates Device for Alzheimer's Patients

## Departments

### 6 **Bright Ideas**

Spotlight on Innovation

### 8 **Time Tested**

The Ouija Board's Patent Trick

### 12 **Lander Zone**

Plastics and Their Cost Formula

### 32 **Prototyping**

Making Injection-Molded Plastic Parts

### 34 **Patent Pending**

Drafting a Patent? Hold the Puffery

### 36 **Eye On Washington**

Would Monopoly Be Patented if New?; Commerce Report Details Apparent Patent Examiners' Fraud

### 46 **Inventiveness**

Focus on the Fun and Fascinating



8



**ON THE COVER**  
Halloween;  
photo illustration  
by Jorge Zegarra

22



# BRIGHT IDEAS

## Dyson 360 Eye ROBOTIC VACUUM

[dyson.com/vacuums/robot/Dyson-360-Eye](http://dyson.com/vacuums/robot/Dyson-360-Eye)

In the making for nearly 18 years, the 360 Eye showed twice the suction of any robot vacuum in testing. Inc. says it's an early candidate for product of the year; [trustedreviews.com](http://trustedreviews.com) says it's the best robot vacuum on the market.

Its 360-degree vision system combines a top-mounted spherical camera with two advanced sensors framing the robot. The vacuum uses complex mathematics to map and navigate a room so it knows where it is, where it's been, and where it needs to clean next. It also charges automatically by taking the most direct path back to the charging dock when the battery's running low.

The 360 Eye is the only robot vacuum with tank tracks to help navigate different surfaces, giving it powerful suction on any kind of floor. Advanced filtration not only captures allergens, it expels air that's cleaner than the air you breathe. You can schedule cleaning and monitor the vacuum with the Dyson Link app. The 360 Eye recharges via a slim dock that fits against a wall and can operate in either a deep cleaning or light cleaning mode.

Launched in August; retail price is \$999.99.



## SunZee

### WEARABLE SUNSCREEN DISPENSER

[sunzee.life](http://sunzee.life)

SunZee is a fashionable wristband that allows you to recharge fresh sunscreen capsules—well suited for anyone who's outdoors a lot, especially skiers and snowboarders.

Each capsule has 3ml of high-quality facial sunscreen: SPF 40, Broad-Spectrum UVA & UVB protection that's chemical free and paraben free. The FDA-approved concentration does not burn the eyes.

SunZee provides feedback when you have extracted the amount recommended by the FDA for an average adult's face. The capsules are made of recyclable polymer, polypropylene, free of aluminum and other heavy metals. To replace the capsule (recommended time is every 80 minutes maximum), just slide in a new one.

The product is expected to begin shipping in December. A package including the wristband, capsule starter pack and Neoprene case will be available for direct purchase online for \$65.



## AMADAS Smart Lock

SOLAR EMERGENCY  
RECHARGING

[amadas.kr](http://amadas.kr)

AMADAS'S key features include DIY installation that's intended to require only a few minutes, as well as the lock's emergency charging solar panel that many consumers cited as a favorite feature when the product surpassed its \$70,000 funding goal during the final weekend of August.

The lock, designed to fit virtually any U.S. standard-size door, is intended to operate for one year with two AA batteries. The solar panel can recharge the lock for one-time use within 20 seconds.

Use your smartphone's flashlight to quickly charge the lock. Using the AMADAS app, you can lock and unlock your door, track who enters your home or office, check the battery level and assign individual guest codes. The stainless steel design prevents intruders from deciphering your code with its anti-smudge finish; it's also anti-corrosive to prevent natural wear, and waterproof to prevent condensation from causing the lock to malfunction.

Estimated delivery is March, with a retail price of \$399.

## Emery & Oak Travel Duffel

CHARGING YOUR PHONE

[emeryandoak.com](http://emeryandoak.com)

This bag's success on Kickstarter reinforces people's desire to keep their phones and tablets charged: With 14 days left in its crowdfunding campaign, the Emery & Oak Travel Duffel had more than doubled its fundraising goal of \$20,000.

The stylish bag comes with a built-in portable charger for those devices, making it a handy travel bag (its 48cm-by-20cm-by-25cm size meets carry-on size limits) as well as for taking to the office or gym. The 10500mAh battery charges an iPhone6 up to three times and gives an iPad mini a full charge.

The travel duffel also has some handy features: nylon lining that separates your shoes from your other gear, and a slip pocket and large zipper pocket.

Estimated delivery is December; retail price is \$179.



## FIIL Diva Pro

FEATURE-RICH HEADPHONES

[kickstarter.com](http://kickstarter.com)

The FIIL Diva Pro are Bluetooth V4.1 on-ear headphones with a sleek design and multiple features.

Billed as the world's first wireless 3D audio headphones with built-in music storage, the Diva Pro doesn't require that a cellphone be connected. With the Voice Command feature, just say "hello FIIL" to awaken the function. Then say, "search (name of song)" and the tune begins to play. There's also a function that automatically pauses your music—and later resumes it—if you take off the headphones.

Maximize uninterrupted listening with four modes: ANC cancels up to 96 percent of ambient noise with no effect on the hi-fi sound; Monitor takes in music while talking to people around you; Open lets in panoramic sound from the environment while still being able to hear music and talking; Wind removes loud wind noise or noise on a plane.

You can save 4G of music—about 1,000 songs. To store via Android or an iOS device, use a USB cable and PC. The headphones support FLAC, WAV and APE file types, as well as other compressed formats.

Future retail price: \$300. Estimated shipping in November.

"All of the candy corn that was ever made was made in 1911. And so, since nobody eats that stuff, every year there's a ton of it left over." —COMEDIAN LEWIS BLACK



# DID THE SPIRITS MOVE HIM?

OUIJA BOARD DEMONSTRATION CONVINCED PATENT OFFICE OFFICIAL, INVENTOR'S DESCENDANTS SAY

BY MORGAN D. ROSENBERG

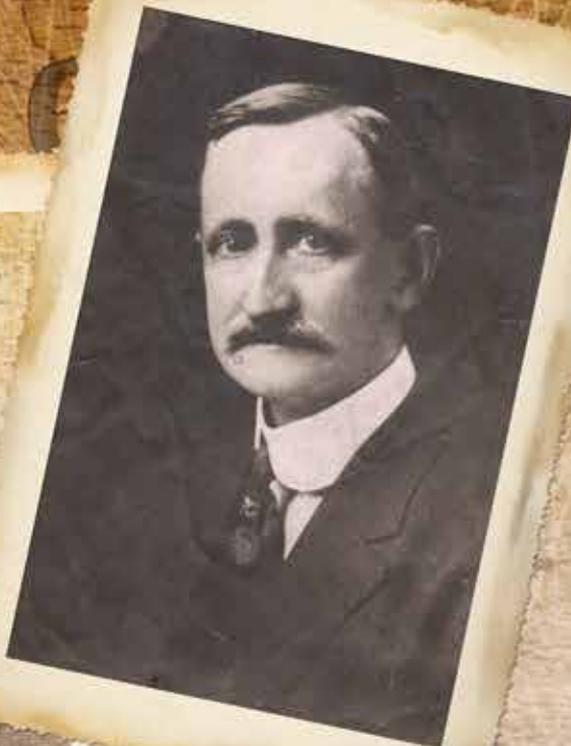
**A**n early advertisement for “Ouija, the Wonderful Talking Board” describes the game as “Proven at Patent Office before it was allowed. Price, \$1.50.” The story of how this iconic spirit board got its patent has more than medium-level intrigue.

Ouija historian Robert Murch conducted interviews with descendants of Elijah J. Bond—often credited as the game’s inventor—and of his business partners Charles W. Kennard and William H.A. Maupin to discover what sort of proof of utility was provided to the United States Patent and

Trademark Office in 1891. Those interviewed said Bond’s creativity and resourcefulness led to U.S. Patent No. 446,054.

## A medium, well done

Bond, who lived in Baltimore, brought sister-in-law Helen Peters with him to the patent office in Washington, D.C., to provide evidence that the Ouija board actually worked. Peters was presented by Bond as “a strong medium”—which, in 1891, probably carried more weight than it would now with regard to “one of ordinary skill in the art.” (Peters, incidentally, is the person responsible for the name “Ouija,” pronounced we-ja. Apparently, she asked the board what its name should be and the letters O-U-I-J-A were spelled out.)



**As the story goes, Ouija patentee Elijah Bond sat down around a table with sister-in-law Helen Peters (acting as a medium) and a patent office official. When the board spelled out the official's name, he was white-faced and visibly shaken.**

The story told by the descendants of the Ouija founders describes a demonstration of the board before the “chief patent officer” at the patent office. It is not clear whether this was the commissioner of patents at the time, Charles Elliott Mitchell, or perhaps the 1890s equivalent of a supervisory primary patent examiner. Regardless, the patent office official tested the efficacy of the Ouija board by asking that the board be used to accurately spell out his name, which was supposedly unknown to Bond and Peters.

The three sat down around a table, Peters acted as medium, and the board spelled out the patent office official's name. As the story goes, the official was white-faced and visibly shaken. He implemented the issuance of the patent on Feb. 10, 1891.

Although it is not the author's place to speculate on the existence of otherworldly spirits, it should be noted that

Bond was a patent attorney and may have known the name of patent office officials—particularly ones with which he would have contact. It should be further noted that the Annual Report of the Commissioner of Patents for the Year 1890 states that there were 30 patent examiners working at the patent office at that time.

### Variants on design

The Ouija board had prior art considerations. So-called “talking boards” were being manufactured at least as early as 1868, and possibly as early as 1848. By the late 19th century, the combination of talking boards with planchettes (the part that moves on top of the board) were already well known. Bond's 1891 patent is not the first teaching of a talking board with a planchette; rather, it teaches and claims a particular type of planchette, one that became popular and allowed for the Ouija board to become a household name.

Although Elijah Bond (third from left) is often credited as the Ouija board's inventor, historian Robert Murch says Bond was more like the patentee. Ouija is the trademark of William Fuld (second from left), who credited E.C. Reiche (far left) as the board's originator. Bond's business partner Charles W. Kennard (right) claimed to be the sole inventor.

Claim 1 of U.S. Patent No. 446,054 reads as follows: “The game apparatus herein described, consisting of a board having the alphabet and numerals and certain signs and figures, arranged as shown, in combination with a table provided with legs and a pointer and operated by the hand, in the manner and for the purpose set forth.” The specific planchette design that overcame the prior art was disc-shaped with a pointer-like protrusion, and was raised above the board on legs.

The specification of Bond's original patent states, “My invention relates to improvements in toys or games, which I designate as an ‘Ouija or Egyptian luck-board.’” But it wasn't until 1901, when William Fuld took over production of the board from Bond, that the name “Ouija” became popularized. Ouija is, in fact, Fuld's trademark for the talking board.

Fuld's name was used on the back of every board, where he was described as the “inventor.” (Ouija researcher Murch says Bond was more of a patentee for the original board.) Fuld made variants on the original design, some of which are still seen in modern Ouija boards. His first Ouija-related patent was No. 479,266, issued on July 19, 1892; this variant added the usage of magnets and wires. His second U.S. patent, No. 1,125,833, issued on Jan. 15, 1915, added the more familiar transparent window to the planchette. His other two patents were both design patents, with U.S. Patent No. D56,001, issued on Aug. 10, 1920, showing the rounded triangular design for the planchette that is still in use today.

### Claims of invention

Although the inventorship—from original to variants in design—appears clear to this point, there is an interesting historical

## TIME TESTED

wrinkle. Despite the fact that Fuld took over the company from Bond, Fuld credited E.C. Reiche as the originator of the Ouija board.

Reiche was a cabinetmaker who had a workshop near the office of Charles W. Kennard, an assignee on the original Bond patent and one of Bond's business partners. However, in a series of letters to the Baltimore Sun in 1919, Kennard wrote that he was the true sole inventor of the original Ouija board. He said he put together a crude version of the board in 1886, using a cake board and a table with four legs and a pointer, with the alphabet and numerals marked with pencil.

Reiche made several copies of the prototype Ouija board at Kennard's request but could not mass-produce them. Thus, according to Kennard, he shopped the concept around and met Bond, who then made several improvements on the crude initial design that included a semi-circular alphabet arrangement and the addition of felt cushions on the indicator legs.

Adding to the confusion, Fuld also made the claim that he had been working on a similar talking board but had been beaten by Bond to the patent office. Although the Patent Act of 1790 was obviously already in place, other similar historical (and often public) conflicts have shown that issues of true inventorship were not given the same type of weight that they are in modern times. Additionally, by the time that Kennard started making his claims, the original Ouija board patent had already expired.

### Recent developments

In February 1927, Fuld was on the roof of his Harford Street factory in Baltimore to supervise the replacement of a flagpole. A support post that he was holding collapsed and he fell to his death. His children took over the business and began manufacturing numerous variants on the original Ouija board. In 1966, the children retired and sold the business—including the patents and trademarks—to Parker Brothers, which was sold to

Hasbro in 1991, and which continues to hold all patents and trademarks for the Ouija board.

Although the USPTO has seen all manner of flimflam over the years, particularly in the form of supposed perpetual motion and "free energy" machines, no other examples of spiritual contact being used as proof of utility at the patent office could be found. When it comes to patents, the Ouija board has the unusual and mysterious history one would expect from such a device.

It also has a never-ending appeal. Murch, chairman of the board of the Talking Board Historical Society and a Ouija researcher for 25 years, credits the game's enduring popularity to our ever-evolving relationship with death.

"Talking boards were born in a time when death was a big part of our daily lives," he says. "Mothers lost young children to disease. When they did, they would dress up those children and have photographs taken of their dead children to remember them by. Many Americans

From left: Robert Murch, Talking Board Historical Society chairman of the board; Helen Peters, who acted as a medium; an early Ouija board model; U.S. Patent No. 446,054 by Elijah Bond, 1891. Bond's board and patent live on through the game and Ouija movies, the latest scheduled to premiere this month.



PHOTO BY ALI COTTON

lost relatives in the Civil War. Some of those soldiers just went away never returned. These devices answered questions that nothing else could.

"Today, death is more removed. We live longer and we don't even want to look old."

Yet "each generation rediscovers the mystifying oracle," he says. Ouija lives on the big screen with the second installment of Hasbro's, Universal's and Blumhouse's Ouija movie franchise: "Ouija: Origin of Evil," which premieres Oct. 21.

"Whether you sit at the board and believe you're communicating with your subconscious or parting the veil and talking to the other side, you are opening a portal," Murch says. "What you're opening yourself up to and communicating with as the planchette slides across the board spelling out messages has been up for debate for 126 years." 🗨️

Morgan D. Rosenberg is the author of *Essentials of Patent Claim Drafting*; *Patent Application Drafting*; and *Patentability of Business Methods, Software and Other Methods*. He specializes in application and claim drafting at Becker & Poliakoff in Northern Virginia.

## INVENTOR ARCHIVES: October 1, 1959

### SUBMITTED FOR YOUR APPROVAL: 'TWILIGHT ZONE' DEBUT IS REGISTERED

The first episode of Rod Serling's "**The Twilight Zone**" was copyright registered, a day before CBS aired the show's first episode—"Where Is Everybody?," starring Earl Holliman.

The iconic sci-fi/horror show ran through June 19, 1964, with Serling writing or adapting 99 of the 156 episodes. Its rare excellence was public knowledge almost immediately. When FCC Chairman Newton N. Minow called TV programming a "vast wasteland" during a 1961 speech, he said "The Twilight Zone" was among the few exceptions.

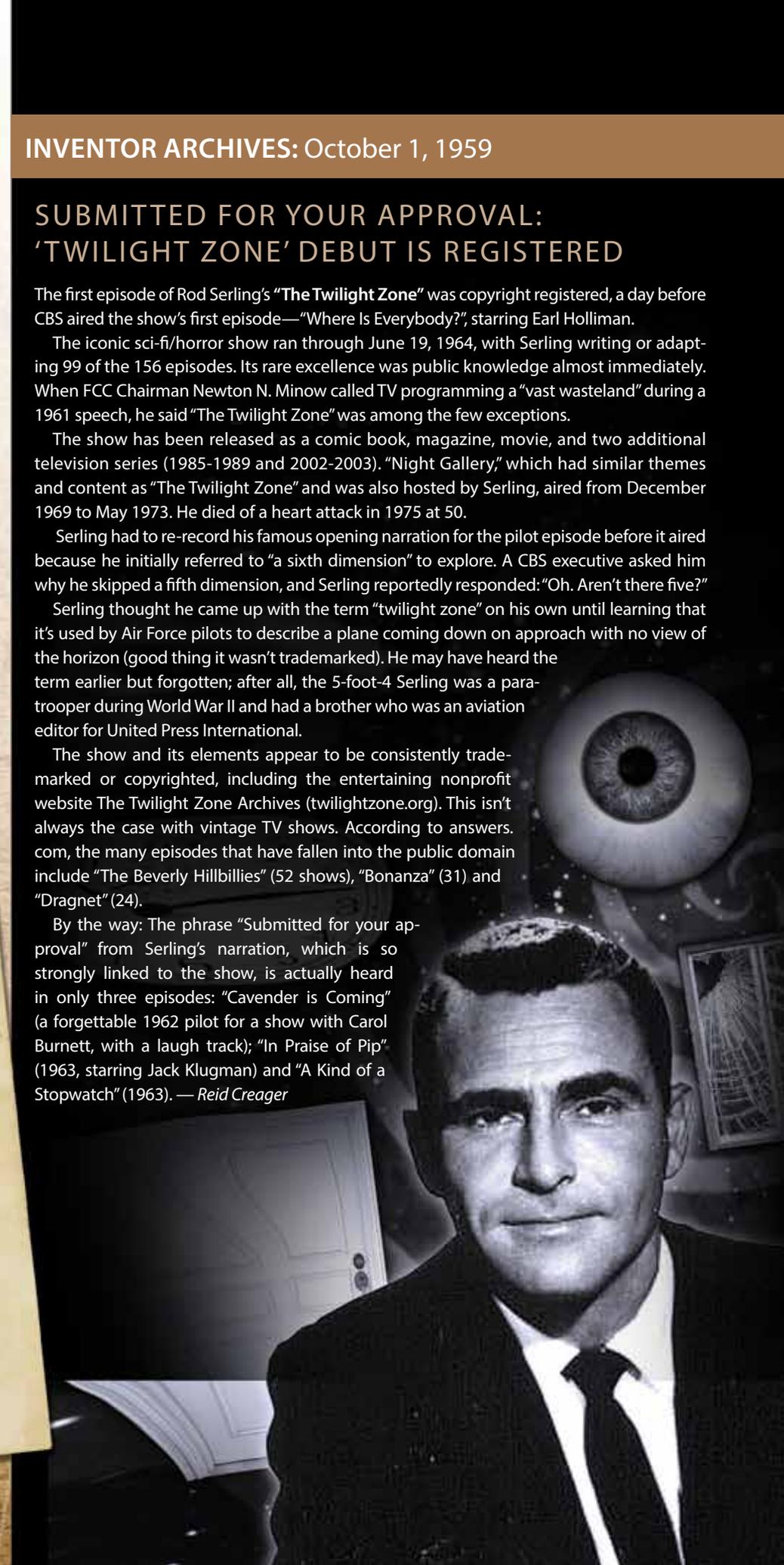
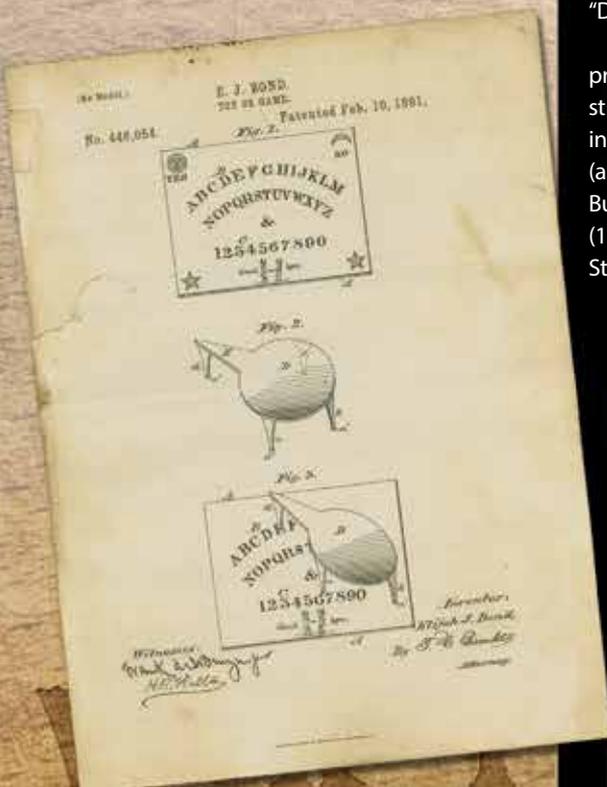
The show has been released as a comic book, magazine, movie, and two additional television series (1985-1989 and 2002-2003). "Night Gallery," which had similar themes and content as "The Twilight Zone" and was also hosted by Serling, aired from December 1969 to May 1973. He died of a heart attack in 1975 at 50.

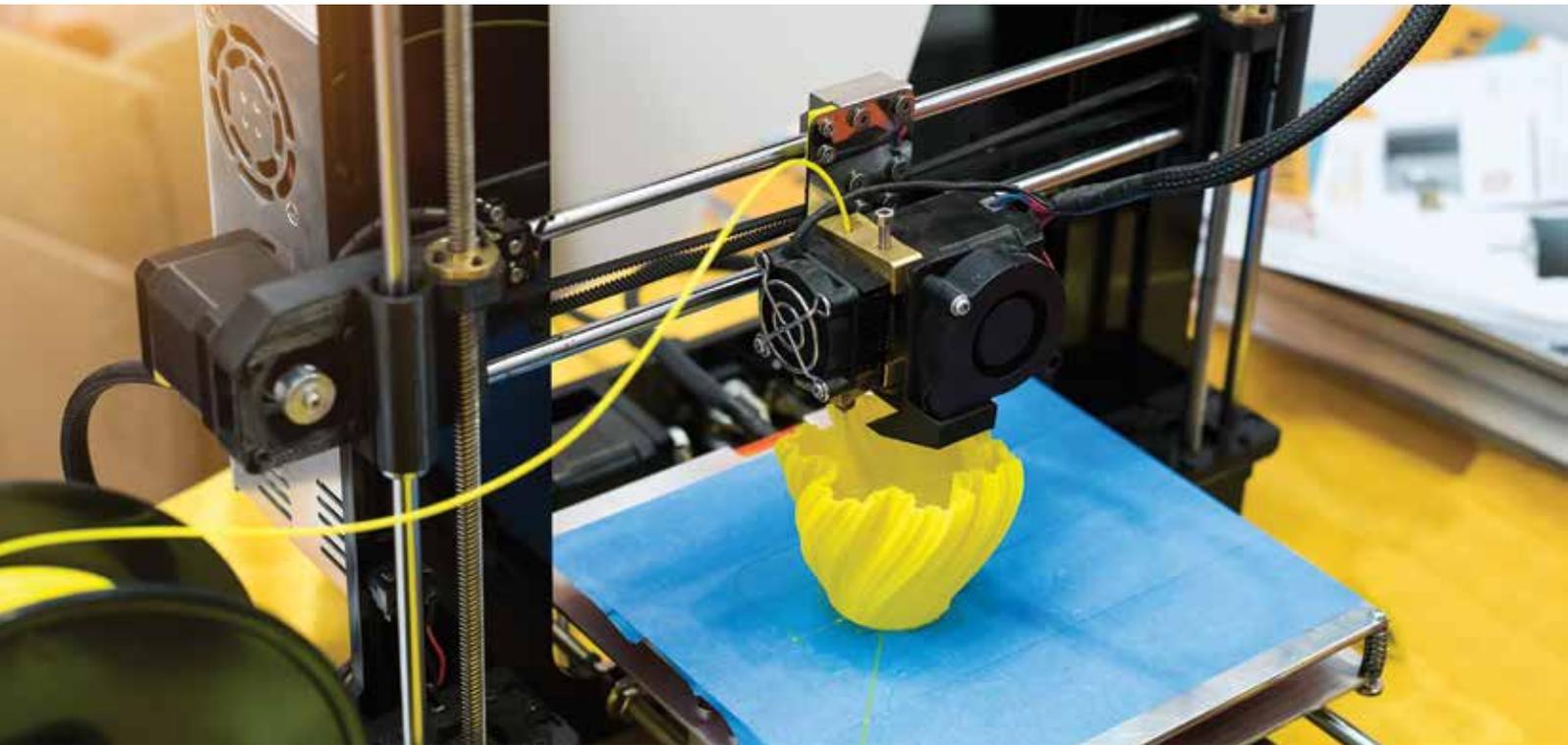
Serling had to re-record his famous opening narration for the pilot episode before it aired because he initially referred to "a sixth dimension" to explore. A CBS executive asked him why he skipped a fifth dimension, and Serling reportedly responded: "Oh. Aren't there five?"

Serling thought he came up with the term "twilight zone" on his own until learning that it's used by Air Force pilots to describe a plane coming down on approach with no view of the horizon (good thing it wasn't trademarked). He may have heard the term earlier but forgotten; after all, the 5-foot-4 Serling was a paratrooper during World War II and had a brother who was an aviation editor for United Press International.

The show and its elements appear to be consistently trademarked or copyrighted, including the entertaining nonprofit website The Twilight Zone Archives ([twilightzone.org](http://twilightzone.org)). This isn't always the case with vintage TV shows. According to [answers.com](http://answers.com), the many episodes that have fallen into the public domain include "The Beverly Hillbillies" (52 shows), "Bonanza" (31) and "Dragnet" (24).

By the way: The phrase "Submitted for your approval" from Serling's narration, which is so strongly linked to the show, is actually heard in only three episodes: "Cavender is Coming" (a forgettable 1962 pilot for a show with Carol Burnett, with a laugh track); "In Praise of Pip" (1963, starring Jack Klugman) and "A Kind of a Stopwatch" (1963). — Reid Creager





## ‘I Just Want to Say One Word to You... PLASTICS.’

UBIQUITOUS MATERIAL IS AN INVENTOR’S FRIEND—  
BUT PRODUCTION IS A COMPLEX COST FORMULA

BY JACK LANDER

**T**he above quote was from Mr. McGuire to Benjamin (Dustin Hoffman) in “The Graduate,” produced a half-century ago—and that one word was intended as career advice to a young man who had recently graduated from college.

In the 49 years since I first watched that movie, plastics has exceeded even its most optimistic forecasts. It has replaced wood, glass and metal in thousands of applications, ranging from contact lenses to lawn furniture.

Naturally, plastic is the first or second material we consider when developing our inventions. It offers these advantages:

- It’s easy to create plastic prototypes using material additive processes such as stereolithography, selective laser

sintering and 3D printing, or material removal machining.

- It’s economical. The utilization of the raw material is close to 100 percent, as against traditional material-removal machining.
- It can produce intricate shapes and details that material-removal processes find difficult.
- Its cost per cubic inch or per pound is relatively low.
- It is machine intensive rather than labor intensive, lowering cost significantly.

Prototyping with plastic is especially attractive due to the low non-recurring costs. Once you have professional computer-aided design drawings, you have 90 percent of your “tooling” paid for. Tooling, in this case, consists of minor

modifications to your CAD drawings’ digital files. These files are used to control the processes such as 3D printing, as mentioned above. Cost per part is high, relative to production process parts, due to the time required. But chances are that you only need a few parts for show and tell, and maybe for testing.

### Myriad factors

So, plastic is the inventor’s friend. But when the inventor becomes a producer, plastic is not entirely a blessing. Production requires a plastic injection mold that may cost from \$10,000 to \$100,000, depending on the size and complexity of the part to be molded. That said, a part that may have cost you \$25 to \$50 as a prototype may now cost you 25 to 50 cents.

Whether you plan to produce or not, you will benefit from having a sense of the costs involved in molding plastic parts. At least it puts you in the ballpark if you wish to estimate the cost of your invention when it becomes a product. And if you want more precision than a ballpark estimate, you will need to know the way plastic molding vendors create their pricing.

Let's start with the machine and the process. A plastic injection molding machine is essentially a big squirt gun. Plastic pellets are loaded into the machine's hopper, are melted at temperatures that are usually hotter than you'd use for baking a cake but below 600 degrees Fahrenheit, and the molten plastic is injected into a mold cavity where it cools, hardens and is ejected as a plastic part. The part is then trimmed from its runner, (a "stem" that hangs on to the part at ejection), and is ready for secondary operations, if any.

**Part cost:** If your invention or product is new and you are about to introduce it to the market, you may feel that you have no competition—that there is no need to be fanatical about production costs early on. That's a mistake. If your product fills a significant waiting want or need, and you start making an attractive profit, you'll have competition. Consider: Every 20 cents of direct cost that you fail to carve out of your product ends up at around a dollar in retail price. If you are forced to price your product higher than what the majority of consumers perceive as a fair price for value received, your sales will not grow beyond the critical threshold that attracts catalogers and retail chains.

**The part cost mix:** Thus, from the beginning you must be deeply concerned about your product's costs—and the cost of a plastic part is a mix of machine time, raw material, setup cost and tooling investment.

From your point of view as parts buyer, these costs will be lumped together in a simple price per part or lot price at some quantity that you determined was best for your needs. For example, if you ask for pricing at 1,000, 3,000 and 10,000, your price per part should drop as the quantity goes up. This is because the setup cost, which may require two hours or more, is spread over the quantity of your order. A \$200 setup cost spread over 1,000 pieces adds 20 cents to the basic cost of the part, which consists of machine time and raw material.

**Size of the molded part:** The larger the part, the more plastic used—and, of course, the higher the cost of material. Less obvious is the size of the mold itself. Molds are subjected to tremendous injection pressure. To withstand the stress of this pressure, the mold is designed and built with lots of metal. It often weighs hundreds of pounds, and it is not uncommon to weigh over 1,000 lbs. To accommodate a large mold, the machine it fits into must be appropriately large. Thus, large parts have a large direct impact on the cost of the mold and of machine time. A large-capacity molding machine costs more to run than a small-capacity one.

**Number of cavities in the mold:** A cavity is the hollow part of the mold into which the plastic flows. For small parts that are used in relatively high volume, it is economic to

make a multi-cavity mold. For example, a four-cavity mold will produce four parts with each "shot" of plastic. The cycle time to mold the four parts in a four-cavity mold is essentially the same as for molding one part in a single-cavity mold.

Although the amount of plastic used to mold each part is the same regardless of the number of cavities, the machine time cost is divided by the number of cavities. If the machine-hour billing rate is \$120 an hour and the molding cycle is half a minute (120 shots per hour), the machine time cost per part would be \$1 if the mold was a single-cavity mold. For a four-cavity mold, the machine time cost would be 25 cents. Thus, if the cost of the plastic was 20 cents per part, the cost of a part produced by the single-cavity mold would be \$1.20, and the cost per part from the four-cavity mold would be 45 cents each.

So, why wouldn't we always make a multi-cavity mold? The high cost of the mold, of course. Molds are very expensive. And although a four-cavity mold may cost only 2 ½ or three times as much as a single-cavity mold, it's still a big and risky investment, often made when the future sales volume is unknown.

**Size of injection molding machine:** Machines wear out or become obsolete. Their original cost must be paid for by assessing it to the parts that it molds, usually based on an hourly cost to pay for and maintain the machine. The bigger the machine, the higher the machine-hour rate. Add to that the cost of increased floor space and electricity required for the machine.

### These are the main elements that determine cost per part:

- Size of the molded part.
- Number of cavities in the mold.
- Size of the injection molding machine and its operating cost per hour.
- Kind of plastic used (polyethylene, polypropylene, nylon, etc.).
- Time and material used to set up and tear down the machine.
- Length of run (number of parts produced after setting up).
- Secondary operations, if any.
- Planned life of the mold (total number of parts produced), assessed as the cost of the mold to each part.
- Personality of the molding shop.



**If your invention or product is new and you are about to introduce it to the market, you may feel that you have no competition—that there is no need to be fanatical about production costs early on. That’s a mistake.**

**Kind of plastic used:** Among the hundreds of available plastics, and the combinations that can be formulated by alloying and by using various additives, only a few are used in the majority of our consumer products. (Plasticsusa.com lists 49 of the most used plastics on its website.) Utility plastics such as polypropylene, high-density polyethylene, ABS, high-impact polystyrene, etc., generally cost less than a dollar per pound. The so-called engineering plastics such as polycarbonate, nylon, Delrin, etc., may cost as much as two to three dollars per pound or more. In general, try to design your product for the lower-cost plastics unless the incremental cost of the better plastic reduces your long-term costs in some way. If in doubt, start with polypropylene and invite arguments about why some other plastic is better for your application.

In addition to what we call plastic, there are several thermoplastic elastomers or “rubbers.” These are less common than non-stretch plastics, but the economics of using plastics also apply to elastomers.

### Here are some of the experts with which to consult:

- Applications engineers at raw-material sources (GE, DuPont, Dow, etc.).
- Plastic injection molders (these fellows have lots of experience, but they’ll naturally favor familiar materials that are easy for them to process).
- Plastic processors (formulators, local).
- Plastics consultants (usually found by networking with molders and suppliers).
- Plasticsusa.com for properties of the various plastics.
- Books. Check thermoplastics and thermoplastic elastomer on Amazon.com.

**Time and material to set up and tear down the machine:** As stated above, this cost, known simply as “setup,” is spread across the various quantities that you have indicated when you request pricing.

**Length of run:** Early in your experience as a producer, you’ll tend to err on the side of order quantities that are too small rather than too large. But as your business matures, your cash flow becomes healthy and you can forecast sales with reasonable accuracy, you may want to invest in larger purchase quantities. You’ll have to balance the cost of “carrying” (storage floor space, insuring and paying interest to your banker or yourself on the money invested) against the reduction in unit price. About the simplest way to do this is to ask for pricing at various quantities. Then, starting with the lowest quantity price, work your incremental investment cost against its annual savings.

**Secondary operations, if any:** The cycle time (total machine time to produce one shot) is usually somewhere around 30 seconds. It may be more than one minute for large parts. During this time, the machine operator typically trims the runner from the part. (The runner is a sacrificial piece that forms the conduit between the injection nozzle of the machine and the actual part being molded.) If the operator is running only one machine, she or he may have idle time (while the part is cooling in the mold), during which minor secondary operations may be performed. Typical secondary operations are assembly of two or more parts and trimming of “flash,” which occurs on some parts, and is a very thin bit of leaked plastic where the two halves of the mold come together perfectly.

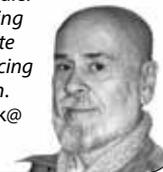
**Planned life of the mold:** A good mold made of steel will probably last for a million parts or more. For example, let’s say that your mold cost you \$25,000, and your mold-maker estimates that it will

have a useful life of 2.5 million parts. So, your cost per shot will be one cent—almost insignificant until it comes time to pay for the new mold.

**Characteristics and experience of the molding vendor:** Every job shop has its own personality. Some prefer short to medium production runs. Some hate small runs and quote high prices to discourage them. Some have little or no experience with elastomers. Some do their own mold making, and others farm out their mold making. And so on. The only protection you have against selecting a vastly suboptimum molding vendor is to understand the economics of molding, as I have explained it here, and know which polymer or elastomer formula is the right one for your part. And armed with answers to both of these factors, you must interrogate the plant manager or knowledgeable technician about its shop. Do you frequently mold polypropylene, etc.? What size parts do you prefer to mold? What quantity is your typical run?

Even after qualifying a vendor, you should qualify at least two more. Prices quoted will depend on the vendor’s workload as well as all of the ordinary factors that make up its costs. A vendor with an extended workload, and key customers that it cannot disappoint, may price high in order to make it worthwhile to break into “preferred” production. Thus, three vendors having exactly the same machines and personnel will quote three different prices. Be sure to get more than one quote. ☛

**Jack Lander**, a near legend in the inventing community, has been writing for *Inventors Digest* for 19 years. His latest book is *Marketing Your Invention—A Complete Guide to Licensing, Producing and Selling Your Invention*. You can reach him at [jack@inventor-mentor.com](mailto:jack@inventor-mentor.com).





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INVENTING FOR THE BOOMING PERSONAL CARE INDUSTRY Part I

# Finally, A Public Bathroom Break That's Clean

THE RESTROOM KIT PROVIDES PORTABLE HYGIENE IN ONE POCKET-SIZE PACK BY EDITH G. TOLCHIN



The kit invented by Bill Massey has a compact container that hosts essential items in public restrooms.

**W**hile preparing my interview with Dr. Jacob DeLaRosa, inventor of the Pee Pocket (Take a Stand, Inventors Digest, January 2016), I began to see a pattern. Personal hygiene inventions are big.

Recent data support this. According to SCA, a leading global hygiene company, the global market for personal care products is growing at a rate of 5 percent annually.

So while judging and lecturing at the June INPEX, America's largest invention show, I had my antennae out for such inventions and met Bill Massey, inventor of The Restroom Kit®. Colleague and patent attorney Andrea Hence Evans made the introduction.

Because restrooms at trade show venues can often be unsanitary, Massey—an Army veteran and father of two—gave me a sample of his invention. The Restroom Kit consists of a patented, oversized toilet seat cover; 3 feet of toilet paper; an individually wrapped, lightly scented hand wipe; and a lightly scented “tush wipe.” The portable hygiene in one pocket-size pack, coming in handy 3 3/4-by-2 5/8 packaging, is so simple that it may fall into the category of “Why didn’t I think of that?”

In Part 2 next month, we interview Dr. Aeneas Janze, inventor of Epic Wipes.

**Edith G. Tolchin: Where did you get your idea?**

**William Massey:** Have you ever been out with family and/or friends, having a great time at the movies, shopping, or amusement parks, and someone had to take a restroom break? You finally find the restroom, but the toilet paper or some other essential item is missing or too spoiled or unsanitary to use. That is especially frustrating for parents with young children. I developed The Restroom Kit after being in that embarrassing situation so many times, with no solution in sight.

**EGT: Have you done any market research on the personal care/personal hygiene industry?**

**WM:** The Restroom Kit is a first-to-market product with enormous potential. It's a uniquely designed compact container that hosts all essential items needed when using public restrooms. According to many university studies done on how germs and bacteria infest public and private restrooms, everyone can benefit by using my invention. However, we focus on women, mothers and children who will sit on toilet seats and use the contaminated toilet paper and other soiled items left in the restrooms. Travelers and vacationers also benefit from carrying The Restroom Kit. Being prepared is important.

**EGT: What is the product made from, and where is it manufactured?**

**WM:** The Restroom Kit is made of standard mill paper. The items that make up the kit come from the same places where major store brands are purchased. The overall cost made it impossible to produce in the United States, so we found a manufacturer in China.

**EGT: Who handled your patent?**

**WM:** The initial patent was handled by Patricia Jackson-Scott, and by me. The Law Firm of Andrea Evans helped me with trademarking my logo and slogan.

**EGT: Are you looking to license the product, or run the business by yourself?**

**WM:** We would be happy to speak with anyone who wants to present a potential licensing opportunity. We're selling The Restroom Kit in a few convenience stores, but the majority of our sales are online.

**EGT: Have you had any obstacles in developing your product?**

**WM:** Our largest obstacles have come from marketing and establishing our brand. Marketing can be expensive, and brand

recognition comes with time and the right people liking what you have to offer.

**EGT: Do you have any advice for the novice inventor?**

**WM:** My advice to any inventor is to be persistent and stay focused. There are an estimated 7 billion people on Earth, so if your idea reaches just 5 percent of that, you've helped over 300 million people. You have to start somewhere.

**EGT: Any plans to add other products to the line?**

**WM:** TimeAway, LLC is our product development company and The Restroom Kit is our flagship product. We plan to release two additional products over the next 18 months. 📞

*Details: [therestroomkit.com](http://therestroomkit.com)*

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



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# Simply Innovative

FARMER'S GRAVEL SPREADER  
IMPROVES SAFETY AND SAVES TIME

BY REID CREAGER



Normally, trucks require another machine to smooth gravel roads after dumping, but attaching the GT II Spreader eliminates that step. Inset: Tim Hudson went to work on an idea that some people had talked about but no one had tried.

**A** farmer living near a rural North Dakota town with a total area of one square mile and fewer than 200 residents, Tim Hudson understood what slow was. Now he wanted to figure out a way to make slow work for him. And he wanted to do it fast.

The recent combination of low commodity prices and high input costs (fertilizer, pesticides, etc.) has added to the rugged challenge of farming. Hudson turned to gravel hauling as supplemental income, only to find he had to pass up some jobs because of the limited ability of his belly dump trailer: The machines generally must reach a speed of 25-30 mph and open their gates in order for the aggregate to spread evenly on the road. But in Colfax—with its gravel streets, farm yards and winding river roads—reaching that speed was often impractical or dangerous.

“There’s kids running around, maybe pets,” said Hudson, owner of TJM Trucking, whose mailing address is 10 miles away in Walcott. “Most of the roads have gravel streets, and the speed limits are low. Even at 30 miles per hour you can be breaking the speed limit and maybe endangering someone.”

Income challenges were growing and other farmers were turning to gravel hauling, making the job more competitive. So he did what was familiar to him. He got busy.

## Starting with a toy prototype

In June 2015, Hudson was graveling a road up to a business. “If you want to spread gravel in these belly dump trailers, you have to be traveling a minimum of 20 miles an hour, closer to 30,” he said. “Physics dictated that I couldn’t start out with a load of truck from zero to 20. So later, a friend of mine and I were standing in the family farm shop, staring at the back of the trailer, and my friend said, ‘Have you ever thought about putting a blade on the back?’ I said, ‘I’ll think about it a little bit.’”

Hudson walked into the house and got a toy truck from the basement. “I put a



PHOTOS COURTESY OF DAN HUDSON

The Hudson family has pitched in to continue to success of the GT II. Front row: Linda and Gary Hudson, Tim’s and Dan’s parents. Second row, from left: Josh Hudson, Tim Hudson, Dan Hudson, Kylie Nelson, Garrett Nelson, Tami Nelson (Hudson). Back row, from left: Jarrett Hudson, Melissa Hudson, Angie Hudson, Jackson Nelson.

cardboard blade on the back and put a little table salt on the counter (to simulate aggregate) just to see if it was physically possible for the truck to drive through, and it kinda worked. I tend to take the simple approach to things.”

Back in the farm shop the next day, he made a small-scale model. At that point he created a small bench top prototype and provided that—as well as a blade fashioned out of old recycled oil pipeline—to his friend, who owned a small manufacturing company. Together, they affixed the blade to the back of Tim’s trailer.

“Between the two of us, we built the first prototype and tried it—and it didn’t really work that great,” he said with a laugh. “So we tried different settings, different operating systems, hydraulic versus pneumatics, and the one we’re selling today evolved from that.”

Not only could the innovation improve safety via driving at slower speeds, it saved time. Normally, trucks require another machine to smooth gravel roads after dumping, but attaching a spreader eliminates that step.

As Hudson went about his jobs in his newly augmented rig, word spread with

the gravel. Customers and other operators asked him where he got the attachment. He began looking into a possible market for his invention.

With the help of his son, Jarrett Hudson, and brother, Dan, the Hudsons began the lengthy process of testing prototypes with the goal of getting a patent. “The original prototype, the GT Spreader, holds a provisional patent application,” Dan Hudson said. “We have been working with our cousin who is a patent attorney and plan on filing our utility patent for the GT II.”

Dan said the original drawings on the provisional application were done by Tim and their first manufacturer, who is also listed on the provisional application. In February, they separated. “We identified issues through our testing, and our manufacturer lacked the technology to make those necessary changes. Some of the issues were that the prototype(s) was unable to hold the blade down with different aggregate or sustain constant steady rear pressure from a bulldozer or pay loader on the push block area due to the improper bracing. Also, the aggregate was bunching up into the cylinder housing. Tim and I did find a solution for that problem as well.”



Tim Hudson walked into the house and got one of his son's toy trucks from the basement. "I put a cardboard blade on the back and put a little table salt on the counter (to simulate aggregate) just to see if it was physically possible for the truck to drive through, and it kinda worked."

An adapter plate ensures a fit for any manufacturer's trailer.

That product wasn't brought to market. "Obviously, Tim and I never wanted to disclose the product until we had one that was thoroughly tested," Dan said.

## Turning the corner

The family started a company owned by Dan (D.T. Hudson, LLC, a veterans-owned retail, manufacturing and distribution company in Lake Park, Minnesota) and built the GT II Spreader. It was designed exclusively by Tim and built by engineers and the new manufacturer, MidMach in Jamestown, North Dakota. MidMach is the only manufacturing company that builds the GT II Spreader.

"The GT II is the same concept, really, as all the other prototypes that were built; the difference is, we own a trucking company and tested the other models we had built as prototypes," Dan said.

"The company identified and made necessary design changes—different angles, different air cylinder, leverage points, different gusset and interior bracing design, even a different powder coat process. We conducted over 200 dumps and spreads with the GT II until we were certain it did exactly what we had always hoped it would do. We placed product liability on the GT II and began marketing it to dealers and construction companies. Drawings for the new GT II were done by our new manufacturer's engineering department."

Tim Hudson said that when it came to the design changes, "I told them how I wanted it to work and how to look and got their opinion on whether I was on the

right track or not. They're the ones with the computer program who can sit there and make changes on the specs and let me know whether it would work."

The brothers are the provisional applicants for the accessory adapter plate, which involved some intricate planning and calculations.

"The original provisional for the blade was a direct fit model and did not include an accessory adapter plate," Dan said. "The original bolted directly on to my brother's trailer. Instead of having to build a different GT II for each different manufacturer, we developed an adapter plate so that the GT II could be built the same and attach to an adapter, which attaches to whatever make of trailer the GT II may fit. Each manufacturer builds the area where we attach to differently."

Accessory adapters can be complicated, involving factors that include spring- versus air-ride suspension, weight, height, angle, platform and the amount of rise the trailer has as it unloads the aggregate. The new company developed several models that fit just about any new or used trailer, regardless of manufacturer. Additionally, if a consumer purchases a different trailer, he or she can simply disconnect the GT II and purchase a different adapter, instead of having to buy a brand-new GT II. The spreader can be swapped out from trailer to trailer with just the purchase of a new adapter plate.

Because of its design, the GT II Spreader also is a functional bumper when retracted that provides rear impact protection. Also, the spreader doesn't add a significant amount of weight, meaning the operator doesn't have to haul less aggregate.

The process involves the simple removal of an existing push block and putting another in its place.

The GT II with adapter plate weighs about 550 lbs. Each spreader is made in Jamestown with 100 percent American parts. The price ranges from \$6,000 to \$7,000. Inventory has sold out since May; after a torrid start to the season, sales are "still steady," Tim said.

## Family involvement

Tim and the current company handled all design elements for the GT II. Dan manages aspects of the invention including financial, website design (mygtspreader.com), marketing, manufacturing and distribution. Jarrett handles sales, product education, is a liaison, and is also a belly dump operator who farms with his father. Tim's and Dan's parents, Gary and Linda Hudson, market the GT II from their home in Arizona.

Despite the popular notion that family members shouldn't be in business together, Tim said it hasn't been a problem. "This has actually facilitated our getting closer as a family—learning how to work together, learning how to work through disagreements. At the end of the day, the family part is the most important part."

More than gravel may be up the road. Tim said his invention may be able to do other jobs, such as spreading blacktop: "We're feeling it out as we go along."

Said Dan: "Based on all of the testing, we knew it would cost us a great deal of time and money to build the GT II the way we needed to, but it was worth every hour, swear word and penny." 🍷



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# Teen Invents With Elders in His Mind and Heart

17-YEAR-OLD KENNETH SHINOZUKA CREATES MOTION DEVICE FOR ALZHEIMER'S PATIENTS **BY EDITH G. TOLCHIN**

**I** first learned of **Kenneth Shinozuka** in an article in the June/July 2016 issue of AARP magazine—not exactly where you would normally expect to read about a 17-year-old. But the whiz kid and Eagle Scout isn't your normal teenager.

The inventor of the SafeWander wearable device, which helps detect motion in Alzheimer's patients, has been a media favorite for at least two years. Shinozuka has given a Technology, Entertainment, Design talk in New York, been to the White House to meet President Obama, and has been written about in many magazines. He's been on "Good Day New York" and many other TV shows.

And what played a major role in this Harvard-bound teen's rise to fame? His love for his grandparents.

**Edith G. Tolchin:** Tell us about your background, family, and what inspired your invention.

**Kenneth Shinozuka:** I was born in Newport Beach, California. I grew up in a three-generation household, so I was always very close to both of my grandparents.

I have two fond childhood memories. The first was singing with my grandfather. I'll never forget the times when we chased garbage trucks down the street as he sang a battle hymn, or when he tucked me into bed at night with a soothing lullaby. We bonded with each other through his songs.

The second was visiting my parents' lab at the University of California, Irvine, where they both were civil engineering professors. Tinkering with their gadgets sparked my interest in science and technology, and my keen awareness of my grandparents' health struggles led me to invent technology that could address the challenges facing the elderly.

**EGT:** How does the SafeWander work?

**KS:** SafeWander is a button that's attached to a patient's clothing through a secure cap-and-twist method. When the patient starts to rise from a bed or a chair, the sensor detects a change in body position and sends an alert to a caregiver's smartphone, no matter how far away the caregiver is.

**EGT:** Did you design the prototype?

**KS:** Yes. I also received help from my business mentor, Alan Kaganov, who is a partner at U.S. Venture Partners.

**EGT:** Has your invention been licensed, or are you manufacturing on your own? If so, where?

**KS:** I am manufacturing the sensor outside the United States. We would consider offers from companies that wish to acquire us or license our sensor.

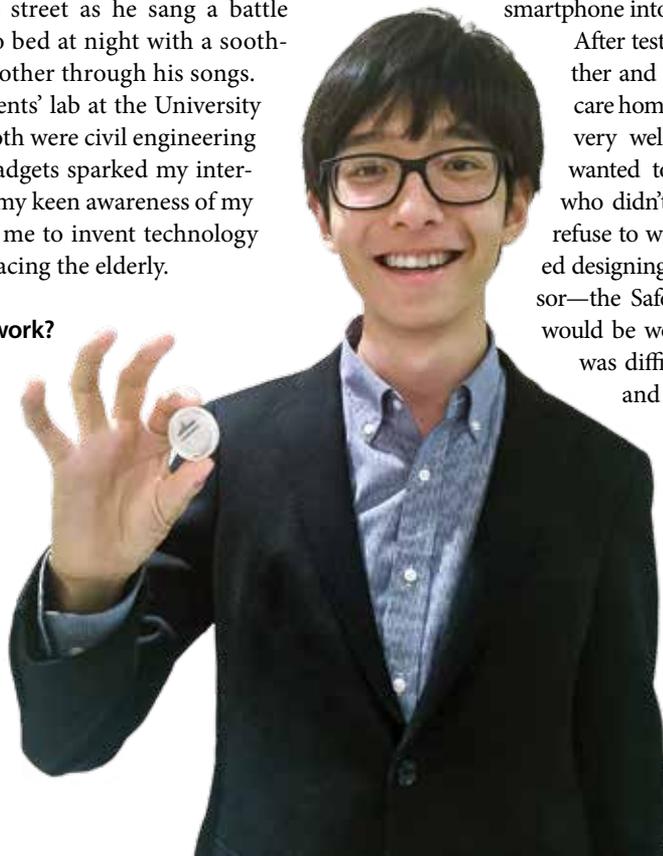
**EGT:** What are some of the obstacles you've encountered? Has your age been an advantage or a disadvantage?

**KS:** I've been working on SafeWander for over 3 ½ years at this point and have encountered countless challenges since. First, I had to think of a way to alert my aunt whenever my grandfather wandered out of bed. When I decided that my monitoring system would include a pressure sensor attached to his sock, I had to create a sensor that was reliable enough to detect his wanderings, yet also thin and flexible enough to be worn on his heel; design and construct a wireless circuit that could be driven by a coin battery; and code a smartphone app that would turn my aunt's smartphone into a remote monitor.

After testing the sensor on my grandfather and patients in various small-scale care homes, I realized the sensor worked very well—but only on patients who wanted to wear socks to sleep. Those who didn't would take off the sensor or refuse to wear it. After these tests, I started designing a different version of the sensor—the SafeWander Button Sensor—that would be worn on the patient's clothes. It was difficult to think of a safe, secure and discreet attachment method.

I initially thought of using Velcro or magnets, but neither could fasten the sensor tightly enough onto a patient's clothes.

One morning, I was screwing a cap onto a bottle of jam and had a "Eureka!" moment. I thought, why don't I use a ring that can





SafeWander is a button with a sensor that detects a change in body position and sends an alert to a caregiver's smartphone.

screw onto the sensor through the back of the patient's clothing? I also needed to create a range extender that could communicate with a caregiver's smartphone no matter where he or she is. To address this challenge, I built a Bluetooth-to-Wi-Fi gateway that gets plugged into an outlet next to the patient's bed, which relays the Bluetooth signal from the sensor to the smartphone via the Wi-Fi of the patient's home or facility.

And on top of all these technical challenges, I also had to commercialize SafeWander. After establishing a start-up, SenSaRx, in the summer between my sophomore and junior years, I started selling the sensor on my website last December. I am currently starting two pilots at care institutions in California and New York to validate its efficacy in large-scale settings. During this entire time, I also had to go to high school (so I suppose my age was a hindrance), compete on my school's debate team, run a student publication, and head a Boy Scouts honor society chapter in Manhattan. Managing my time was certainly challenging.

**EGT: Tell us about your TED talk.**

**KS:** My TED Talk took place in November 2014. I was invited by a representative from TED, which was hosting a TEDYouth conference in Brooklyn.

**EGT: Where has success from this invention taken you?**

**KS:** I've been invited to conferences and TV shows on four separate continents. I'm incredibly fortunate and lucky to have received this level of attention from the media and various health/science organizations.

**EGT: Have you invented any other products?**

**KS:** I created two sensor prototypes—certainly not full-scale products—when I was 6 and 7 years old. The first was a Smart Bathroom that would send an alert to a caregiver's wristwatch when a patient fell down on the bathroom floor. The second was a Smart Medicine Box that would remind a patient to take the right medicine at the right time. I'm currently working on other products and extensions of SafeWander.

**EGT: Do you have any advice for our inventor-readers?**

**KS:** First, you don't have to be a genius to make an impact in the world. I'm more or less an ordinary kid, and if my ineptitude at opening doors the right way or following simple instruction manuals is any indication, there are lots of youth scientists who are way smarter than I am. I just happened to discover a passion in elderly care technology and found personal motivation to keep pursuing it through my love for my grandfather. Second, recognizing a problem in the world around you is the first step—and also a prerequisite—to creating a valuable solution. If you want to help the fight against cancer, observe specific, daily challenges that a patient with cancer has to face. 📦

*Details: [safewander.com](http://safewander.com)*

PHOTOS COURTESY OF MARIA FENG

# TRICKED-OUT INVENTIONS

**W**e've come a long way from the days when battery-operated masks and little lighted bags along the sidewalk were high-tech. Spirited along by invention and 21st-century technology, Halloween is an ever-exploding monster mash of creative possibilities.

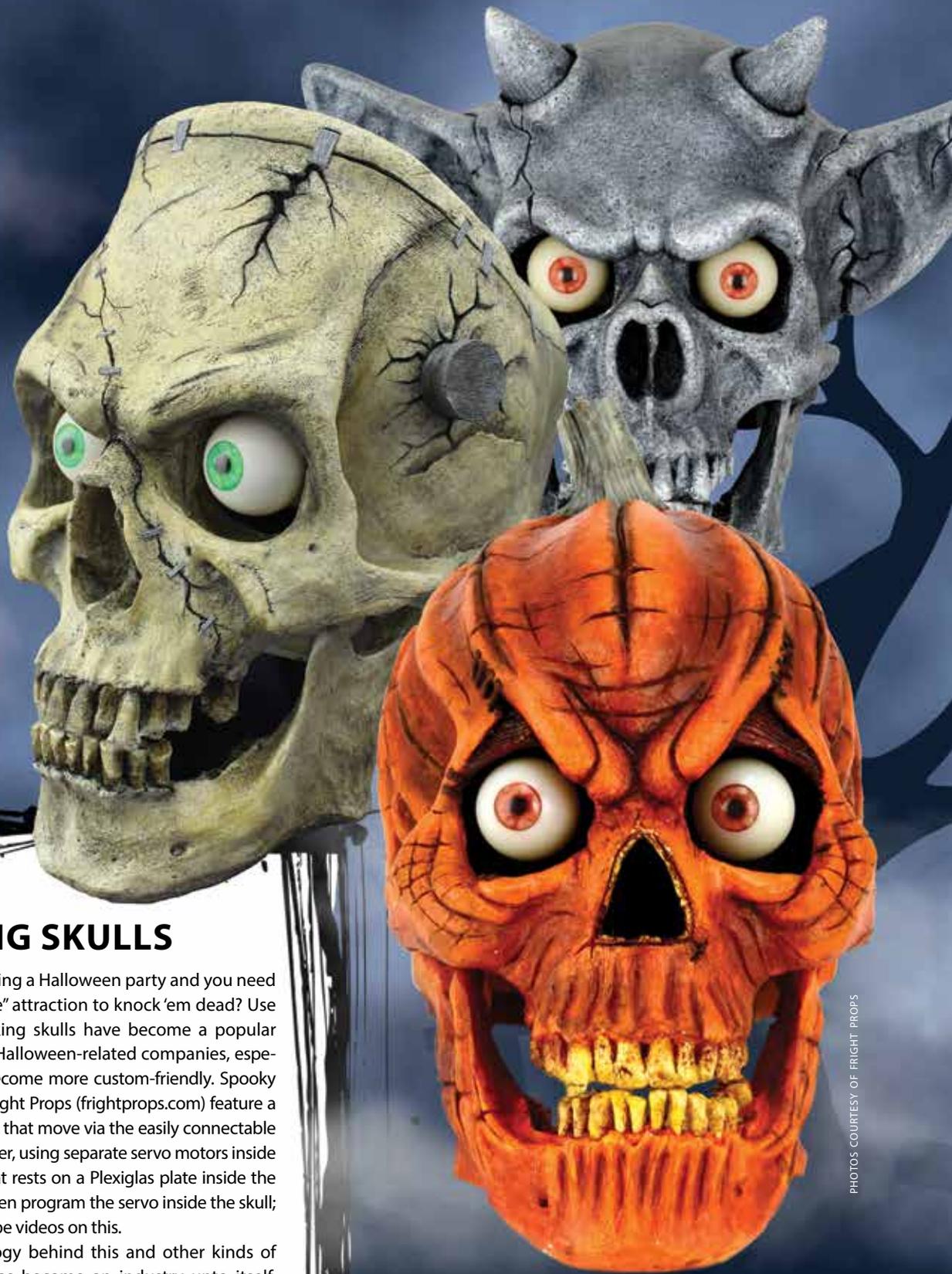
Americans spent \$7.5 billion on Halloween last year, according to the National Retail Federation. But a happy Halloween is about so much more than a trip to the store. It seems that with each passing year, our planning and creations become more intricate and outlandish in an effort to produce that hauntingly memorable costume, visual effect

or party. Home and yard decorations are growing to near-Christmas proportions; 44.8 percent of Americans plan to festoon their property for All Hallows' Eve.

Companies around the world are always conceiving, strategizing, diagramming, producing and marketing in their quest for that Halloween innovation that rocks the culture—until The Next Big Thing supplants it. These next few pages reflect some of that fun but high-stakes competitiveness, featuring some of the most otherworldly crazy and scary innovations ranging from high-tech eye candy to low-nutrition stomach candy. Boo? Yeah. — Reid Creager



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## TALKING SKULLS

So you're planning a Halloween party and you need a speaking, "live" attraction to knock 'em dead? Use your head. Talking skulls have become a popular choice among Halloween-related companies, especially as they become more custom-friendly. Spooky specimens at Fright Props ([frightprops.com](http://frightprops.com)) feature a mouth and eyes that move via the easily connectable PicoTalk controller, using separate servo motors inside an assembly that rests on a Plexiglas plate inside the skull. You can even program the servo inside the skull; there are YouTube videos on this.

The technology behind this and other kinds of animatronics has become an industry unto itself. Fright Ideas ([frightideas.com](http://frightideas.com)), known for its BooBox prop controller that went to market in 2004, carries servo controllers, motor controllers, lighting controllers and more.

This pumpkin-inspired talking skull and its chilling cousins from Fright Props can be complemented with props, parts and accessories, and even skin masks.

PHOTOS COURTESY OF FRIGHT PROPS

## FULL-BODY ANIMATRONICS

**A**nyone who's been to Chuck E. Cheese has gotten a firsthand view of animatronics, defined by Dictionary.com as "technology connected with the use of electronics to animate puppets or other figures." Animatronic birds featured in 1964's "Mary Poppins" marked the first use of the technology in a motion picture.

These ain't Chuck E. Cheese or Mary Poppins. Spirit Halloween ([spirithalloween.com](http://spirithalloween.com)) is among the companies featuring a glut of ghosts and creepy critters that you may wish weren't so realistic in motion. Some members of Spirit's exclusive "family"—like the 2.5-Foot Cerberus Three-Headed Dog with its fire-red eyes, glowing throats, menacing scowls and wild shaking—can be augmented with a fog machine or other props. The 5-Foot Floating Ghost Girl slowly rises up a wall, uttering an ominous warning, before her arms and head pop up. The 3-Foot

Swinging Lil Skelly Bones dares you to come near with his glaring eyes and haunting chant. And the motion-activated 6-Foot Howling Werewolf, well, it shrieks for itself.



The Cerberus Three-Headed Dog is especially scary in a doghouse or dark enclosure.



The Floating Ghost Girl comes with two different spooky spoken tracks.



The Swinging Lil Skelly Bones is a disturbing presence with his glowing eyes and menacing chants.



The 6-foot-tall Howling Werewolf has a moving head and human-like utterances.

# PUMPKIN CARVING

**I**ntellectual property giant Intellectual Ventures has an annual tradition of Halloween spirit, featuring inventions on its website (intellectualventures.com) that range from fog machines to invisibility cloaks. One of its more recent entries was a pumpkin carving kit that helps the everyday Eddie or Elvira fashion a truly standout and even sophisticated jack-o'-lantern.

IV linked to Patent No. 4,828,114—with a listed inventor of John P. Bardeen on May 9, 1989. The world of generic, triangle-shaped pumpkin eyes was about to be smashed to smithereens.

Today, Grampa Bardeen's® Family Pumpkin Carving Set (grampa bardeen.com) promotes pumpkin artistry via a kit that includes 10 Teflon-coated saws, three different-size drills, three steel-tipped pokers, two scoops (to remove the goop inside) and 16 fun patterns.

The carving set was inspired by the notion of families working together to carve jack-o'-lanterns. In the Bardeen family, that tradition began 73 years ago in Racine, Wisconsin, when "Grampa" Paul Bardeen created tools to help the family carve creatively and safely—and without knives. According to the website, Bardeen used pieces of coping-saw blades inserted into wooden dowels to create the first fine-toothed saws designed for carving pumpkins.



John Bardeen's daughter, Tara, helps daughter, Finn—now a fourth generation of Bardeen family pumpkin carvers.

PHOTOS COURTESY OF TARA BARDEEN/GRAMPABARDEEN.COM

He also developed a method of transferring a pattern onto a pumpkin, using the tip of a nail to poke along the design lines of a paper pattern pinned to the pumpkin. Once the pattern was removed, one simply carved along the dotted lines for a more artistic carving.

Not long after Paul Bardeen died in 1983, his children formed a company called Pumpkin Masters and created the first carving set on the market, complete with creative patterns.



John Bardeen

## OTHER PUMPKIN PATENTS

**No. 20,050,274,242 A1.** Pumpkin carving kit, Dec. 15, 2005, by inventors Colleen and Dave McMahon: The kit, which includes a knob with a threaded connector and templates used to form face shapes, may include a striking mallet and scraper. Each template has a sharp bottom rim defining a cutting edge and a top rim. The top rim has a retention strip extending across, and a threaded hole within the retention strip for receiving the knob's threaded connector.



**No. 764,207.** Toy jack-o'-lantern, July 5, 1904, by inventor George Elverd Robinson: The stated goal was to produce a pumpkin form that is lightweight, capable of being suspended and holding a light, and with "luminous portions representing facial characteristics." The diagram includes complete and sectional views, with the top whole pumpkin (Figure 1) and bottom whole pumpkin (figure 4) depicting different designs. These were commonplace for many of us while growing up.



**No. 20,070,036,920 A1.** Pumpkin decorating device, Feb. 15, 2007, by erfinders (German for "inventors") Timothy Birkmann, Joseph Conte and Thomas Weiss: The description sure sounds less complicated than the diagram looks. It's an insertable device that's configured to simulate the appearance of traditionally carved jack-o'-lanterns. The decoration device has facial feature simulation elements to accommodate the pumpkin's curved outside surface, and stickers that can be affixed to enhance facial features.



## LIGHTING

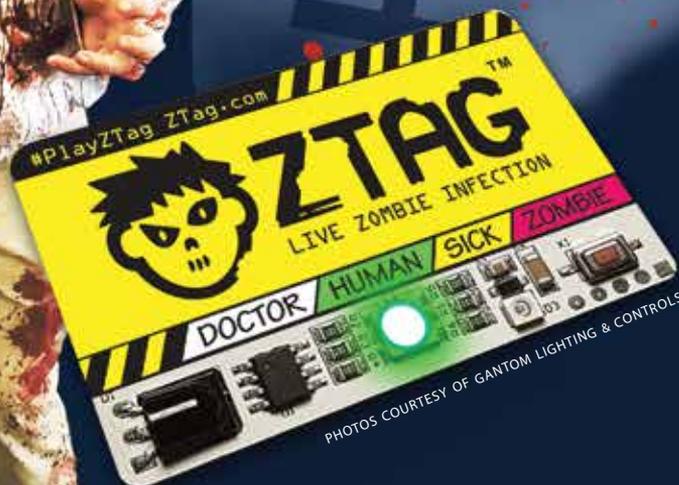
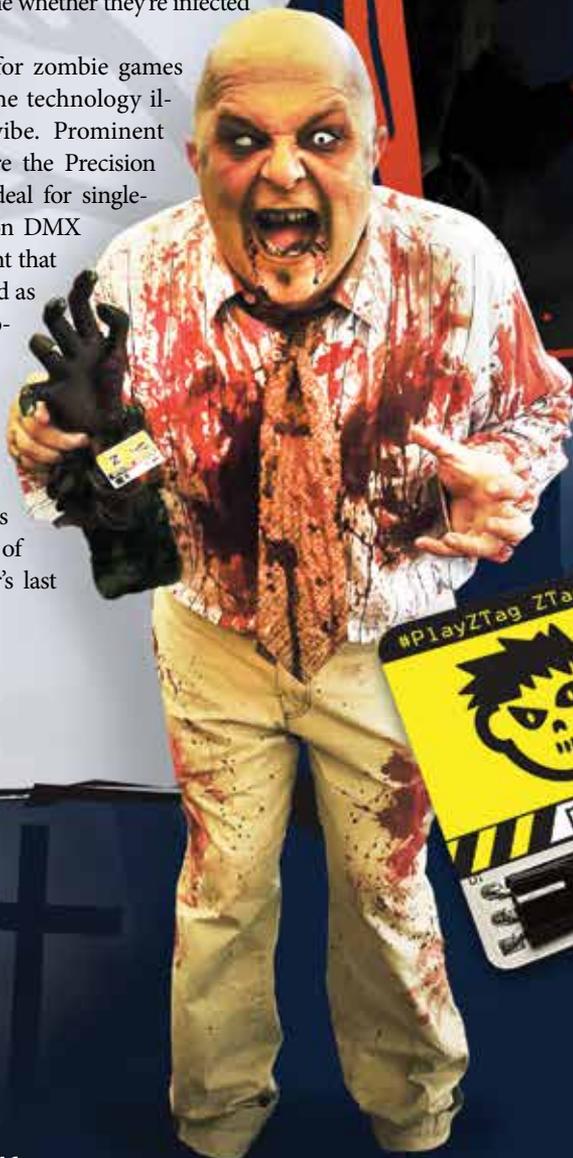
**T**he back-from-the-dead gentleman below is proof that when it comes to Halloween lighting and effects, we're talking about serious game.

Valencia, California-based Gantom Lighting & Controls participated last year in ScareLA, a Halloween trade show that gave the company a chance to display its Gantom Torch technology and zombie tag game. The zombie, an actor hired by the trade show, had the BlinkFX Mini-Emitter built into one hand—part of the Z Tag game. According to Garrett Higa, the company's artistic lead, "the tag tracks whether you're a living human or have become a zombie. It receives and outputs infrared light. If you're a zombie, your tag blinks red to tell other people you're a zombie. If a human tag—which blinks green or yellow, depending on their health—receives that zombie tag, it'll register and basically determine whether they're infected or have outright died."

Whether it's IR lighting for zombie games or special-effects lighting, the technology illuminates the Halloween vibe. Prominent at Gantom ([gantom.com](http://gantom.com)) are the Precision Z Spotlight or Floodlight (ideal for single-color light), and the Precision DMX RGB Floodlight (ideal for light that changes colors). Its iQ is billed as the world's smallest gobo projector with zoom and focus for professional lighting applications—perfect for when you need to project an eerie "breakup pattern."

Even Gantom's name says Halloween: It's a combination of "Gan," the company founder's last name, and "phantom."

The Gantom Torch is infrared-light controlled. When you take it through a haunted house with BlinkFX Mini-Emitters hidden in a room and the torch receives that signal, the torch changes according to what kind of signal the emitter is sending out.



PHOTOS COURTESY OF GANTOM LIGHTING & CONTROLS



A mini-haunt from a recent trade show shows off Gantom's torch technology—including the Precision Z and Precision DMX RGB spotlights.



## BUG TAPE

This perfect-for-Halloween treat—gummy candy bugs that you unroll on a tape—is aptly named in more ways than one, because its creators felt a little squishy about submitting it for licensing.

While on a fly fishing trip, Edison Nation members and college buddies Adam Adams and Bill Ward decided to partner as inventors. From there, their journey to Bug Tape glory is a story of talent and timing

Almost 10 years ago, their licensing agent encouraged them to think candy concepts because they're quick to market; more important, several major toy manufacturers were crossing into that realm. Adams and Ward chose bugs because of their play value, not to mention the potential appeal of the creepy and icky. The tape concept was novel and compact. But then the Great Recession hit, and the idea sat dormant like a dead bug in the attic.

When product development experts Boston America and Edison Nation recently teamed for a search involving candy packaging and dispensing innovations, the two submitted Bug Tape despite thinking some of their other ideas might be a better fit. (Adams felt it was the duo's least likely idea to get a licensing deal.) But Boston America loved it. The candy was licensed in January this year, debuted at the Sweet and Snacks Expo in Chicago in May, and has been in the running for the Most Innovative New Product Award.

Now it's available at retailers throughout the United States (the creators must get a kick out of the fact that Amazon.com lists Bug Tape under "Grocery and Gourmet Food"). Adams remains active in product development, while Ward runs a rapid prototyping business when not managing restaurants he owns in Ecuador. We hope none of the Bug Tape creatures end up in anybody's soup.



PHOTOS COURTESY OF EDISON NATION



# Parts That Fit Your Life

HOW INJECTION-MOLDED PLASTIC PIECES ARE MADE

BY JEREMY LOSAW

**C**hances are good that by the end of today, you will have used multiple products that have injection-molded plastic parts.

These parts are abundant—whether in toys, automotive parts, vacuums, printers or any number of items. They are cheap to manufacture in quantity and can be designed with complex shapes that are hard to achieve with other processes. Most of the products brought to market through Edison Nation have at least some injection-molded parts. We are well versed in the best practices to design them in an attractive yet functional way.

In injection molding, liquid plastic is pumped into a mold and allowed to cool to form the shape of the desired part. Even though most injection-molded parts can fit in the palm of your hand, the machines used to make them are usually between 13 and 40 feet long.

The process starts at the material hopper, where plastic pellets are heated until liquefied. Then a large screw drives the molten plastic into a mold that is usually made from hardened steel. The mold has two halves that are tightly held together by a large hydraulic cylinder or motor. Once the mold is filled with plastic, it is cooled so that the plastic hardens. The clamp is released and the parts are pushed out of the mold with ejector pins. The mold closes and the cycle begins again. Cycle times can be as little as a few seconds to more than a minute, depending on the size of the part.

Injection molding requires that parts be designed a certain way to take full advantage of the process and make the parts look and function well. Here are some common practices and features of injection-molded part design.

## Constant wall thickness

The first tenet of injection mold part design is that parts should have the most constant wall thickness possible. Having a constant wall thickness lets the plastic flow through the mold consistently and lessens the likelihood of an imperfect part. Consistent wall thickness also helps the aesthetics of the part. Thickened areas cool more slowly and cause the material to shrink and pull away from the mold. The resulting divots, called sink marks, are usually in areas of increased thickness.



This desk organizer cup has drafted (angled) walls to help it release from the mold.

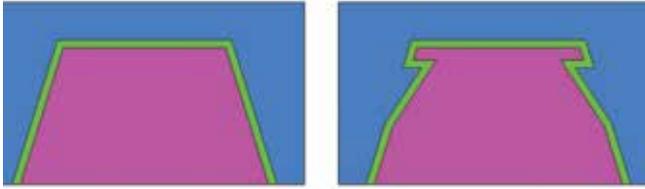
## Draft

Draft describes the slightly angled surfaces found on injection-molded parts, required to allow the parts to be released from the mold without sticking to it. The amount of draft necessary on plastic parts depends on the surface finish but is usually between 1/2 and 3 degrees. Parts with deeper surface texture require more draft than smooth parts to prevent the mold from dragging on and causing surface imperfections.

**In injection molding, liquid plastic is pumped into a mold and allowed to cool to form the shape of the desired part. Even though most injection-molded parts can fit in the palm of your hand, the machines used to make them are usually between 13 and 40 feet long.**



The rib structure on the bottom of a pedestal fan base is designed to give the part strength while keeping consistent wall thickness.



In this cross-section of an injection mold tool, the green is the part being molded; pink is the core of the mold; and blue is the cavity. The design on the left has no undercuts and can be demolded without an issue. The part on the right has an undercut on the core and the cavity, and will need a more complex tool or be redesigned.

## Undercuts

In order for all of the features of a plastic part to be formed correctly, they need to be accessible to the steel of the mold. In a standard two-piece or single-pull mold, this means that there can be no undercuts—the features perpendicular to the pull direction that would lock the part to the mold. The goal is to always design the part to have all of the functionality and aesthetics while avoiding any undercuts.

Because that is not always feasible, injection molders have ways to deal with this. Secondary actions called side pulls can be added into the mold to form the geometry that is hidden from the main core and cavity of the mold. If the geometry is particularly tricky, a cam can be used to rotate the steel away from the part and unlock it from the mold.

## Fastening features

Injection molding allows for some unique ways to fasten parts together. One of the most widely used techniques to join plastic parts is the snap fit. Snap fits are long beams of plastic with angled heads that are molded into the part. As the parts come together, the beam bends and the head snaps into a cavity in the mating part to lock it in place.

The geometry for a snap fit can be adjusted, depending on the material and the desired assembly and holding force.

A shell of a Hot Huez compact shows the snap fit feature that holds the lid closed. The head on this one is not too aggressive, so the user can easily open the compact.

Screws are also a popular option to join together injection-molded parts. Bosses can be designed into the parts to allow screws to be threaded into the part without the need for a nut. The threads of plastic screws have aggressive threads that cut into the screw boss to provide a strong connection.



## Overmolding

Overmolding is a process in which an injection-molded part is put into a second tool and a different material molded on top of the original part. This is a common design feature on products that require a rigid substrate and a soft-touch area. Overmolding is commonplace in power tools and toothbrushes.

Overmolding gives designers many more options to incorporate multiple textures and colors into a product, but it is not without consequence. It requires a second set of tooling, which makes the production more costly. There is also a higher rate of rejected parts because the overmold can bleed into areas where it is not supposed to be.

In this kids' toothbrush, the main plastic body is molded in a rigid purple plastic and the soft-touch grips are overmolded in a pink rubber.



## The exceptions

Sometimes, rules have to be broken—such as when overmolded parts have variable wall thicknesses or really thick areas. Usually, the soft-touch material is more expensive than the rigid substrate, so it is more cost effective to fill the volume with the cheaper material. Undercuts are also very common, because it is often more economical to use a mold with side actions than to design out the undercuts. How far we break the rules depends on the details of the product being designed. 🛠️

A screw boss and screw from a kids' bath toy show the aggressive threads on the screw.



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# Drafting A Patent?

# **Hold the PUFFERY**

LET YOUR INVENTION'S FUNCTIONALITY AND UNIQUENESS DO THE TALKING

BY GENE QUINN

**A**lthough a patent application is not a sales pitch per se, most inventors will find it helpful to list as many descriptive objectives of the invention as possible—sans puffery.

As a general rule, you should stay away from laudatory language (e.g. “the best gadget known to man” or “the perfect solution” or “using this tool is unquestionably the choice any professional would make”). When you puff, the tendency is to skimp on the descriptive details, which are essential to an appropriate patent application. Further, is anyone likely to take your word for it being “the best”? Describe the functionality of your invention, explaining in words and images how the invention works and why it is superior and unique.

By way of example, many times inventions are not one of a kind but are improvements upon existing solutions. In this situation it is common that the advantage of the new invention lies in that it is cheaper to make, easier to use, more efficient, less

noisy, easier to clean, more durable, stronger, faster, more resilient, etc. These are things that you should include in your disclosure, but frequently this type of patentably relevant information is not conveyed with as much detail as possible and appropriate. In fact, many times the patentably relevant information is not described as well as largely irrelevant information about marketing strategies and likely consumer demand.

Discussion of what makes an improvement better, stronger and faster should take precedent. Inventors should consider adding more of this type of information than they are generally accustomed to doing. Keep the puffing for the sales department, the market and consumer demand for your business plan, and spend your time in a patent application describing what makes your invention structurally and functionally unique.

I always encourage inventors to ask this question: What are the advantages of your invention? Perhaps one of the advantages is that your invention is smaller than comparable substitutes.

If that is the case, you might want to specifically include a statement explaining that one of the objectives of the present invention is to provide a smaller, more compact, more lightweight, more easily transportable alternative.

Keep it simple, straightforward and descriptive. This setup allows you to define a theme and build upon that to accentuate the positive. It also allows you to identify what you believe to be unique about your invention in a way that is free from any admissions that a patent examiner can and will use against you.

Similarly, if you have created a multi-use product in which the prior art is all single use, you might want to explain that one of the objectives of the present invention is to provide a stronger, more durable alternative that provides enhanced functionality.

## Articulate the unique

There are legions of patents on inventions that combine one gadget with another. Today the mere combination of one gadget into another is likely not enough to obtain a patent. You need to be able to articulate the invention so that it does not seem to be a trivial variation or trivial combination of two known gadgets. Focus your description on the counter-intuitive, unexpected and ingenious. To do this, consider the problems you faced while creating the invention and tell the story of the invention in a positive way that describes the nuances without making them seem trivial or common-sensical.

Another thing that inventors frequently struggle with is articulating the patentable feature and/or unique contribution the invention is making to the field. Puffing is again a typical crutch here. “I’ve searched far and wide, and this invention does not exist on the market anywhere” is not a substitute for describing structural and functional uniqueness, which is what is useful to the patent examiner. You must have an invention that is different than the prior art—and there is always prior art for an invention.

Many times inventors will describe their invention in great detail, and it may well be new, but they fail to articulate why it is different. A good, thorough description is required; it does no good to say that everyone will want to buy the invention. The patent examiner doesn’t care. What is the unique advantage? Explain that thoroughly, focusing on any possible alternatives.

Generally speaking, in order to obtain a patent an invention must be new (i.e., never before done) and must not be obvious (i.e., not a trivial combination of things already known to exist in the prior art). Many times after reading invention disclosures or draft patent applications, I am left wondering why the invention is new and why it is non-obvious. This major problem occurs because too much focus is placed on commercial discussion and marketing strategies at the expense of the more difficult to describe—the innate innovative uniqueness.

First, inventors should ask: What is unique about the invention? What sets it apart from what is already available in the prior art? Here you should focus on the functionality, but you cannot limit

yourself to that. Define structure in writing and use illustrations to bolster the description. A picture can be worth a thousand words.

Second, in order to obtain a patent it is not enough that an invention be new and/or different when compared to the prior art. It must also be non-obvious, which means that one of skill in the art would not have thought to make the invention prior to seeing it described.

One common mistake by inventors is spending a tremendous amount of time discussing everyday components but failing to really focus on those components, combinations or steps that set the invention apart. You should specifically and explicitly mention what sets your invention apart and will make it patentable. Focus on those aspects of the invention that are counterintuitive, provide unexpected results or cooperatively behave in a way that was unanticipated. This goes a long way toward defining uniqueness and sets you up in a good place to later argue that the invention is not obvious. Rest assured that 99.99 percent of all patent claim sets will receive an obviousness rejection. That is where the rubber meets the road for patentability.

**“I’ve searched far and wide, and this invention does not exist on the market anywhere” is not a substitute for describing structural and functional uniqueness, which is what is useful to the patent examiner.**

## Don’t box yourself in

As with everything else in patent law, you need to be careful. I always recommend that inventors stay away from saying things like “the only thing that makes the present invention unique is...” Rather, consider saying something like “one of the things that makes the present invention unique is...” The second alternative is only slightly different but leaves the door open for you to argue later during prosecution that other aspects make the invention patentable. The first alternative would likely be construed as an admission and could be very difficult, if not impossible, to get around.

Making absolute, hard-line declarations in a patent application is inappropriate and leaves no wiggle room. Even if you do the best search money can buy, you won’t find everything the patent examiner will use against you during prosecution. This is because patent applications remain secret for 18 months after they are filed, so any patent search is at best a snapshot of what the prior art was as of 18 months earlier. 📌

**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.





## Would Monopoly<sup>®</sup> Be Denied a Patent if it Was New?

AFTER ALL, SOME FEDERAL CIRCUIT JUDGES SAY RULES OF GAME PLAY ARE ABSTRACT IDEAS **BY GENE QUINN**

**T**he application of the Supreme Court's 2014 decision in *Alice v. CLS Bank* by the United States Court of Appeals for the Federal Circuit has been disappointing, to say the least. There have been some rays of hope for innovators with decisions in *DDR Holdings*, *Enfish* and *BASCOM*, but these bright spots shine so radiantly because they are scattered in a sea of despair. Whether or not the Supreme Court intended to kill software patents, the way the federal circuit, Patent Trial and Appeal Board and many patent examiners have applied *Alice* is to render much software patent ineligible in the United States.

One particularly disconcerting and largely unpredictable aspect of *Alice* is how it has been used to render games patent ineligible.

The United States Patent and Trademark Office has long issued patents for new games using conventional equipment (e.g., balls, clubs, cards, etc.) where the invention lies in the steps of the game. For example, in 1935 the USPTO issued U.S. Patent No. 2,026,082 on Monopoly<sup>®</sup> and has had gaming art units and classifications for decades.

Given the way *Alice* is being interpreted by both patent examiners and some of the judges on the federal circuit, one has to ask whether games are patent eligible any more. Could Monopoly be patented if it were newly invented in 2016?

According to at least some federal circuit judges, rules of game play are abstract ideas. But how can something be abstract when it is defined with enough specificity to allow average citizens to enjoy countless hours of enjoyment? What exactly is abstract about a game, or the rules of a game? Absolutely nothing.

Monopoly is not the only successfully patented game, although it may be the most famous patented game. Still, in the field of card games, the USPTO has long issued patents for entirely new games, improvements to existing games and new betting options and/or payouts for existing games, all using conventional playing cards. See U.S. Patent No. 5,823,873 (improved poker game using conventional cards commercialized as Triple Play Draw Poker<sup>®</sup>); U.S. Patent No. 5,154,429 (method of modified blackjack using conventional cards). There have also been many success stories of inventors commercializing or licensing patented new games.

### *In re Smith*

Notwithstanding, in March the federal circuit issued a curious and highly questionable decision in *In re Smith*, which incorrectly expands the “abstract idea” test of *Alice* well beyond where the test was ever envisioned. The panel decision extended the *Alice* reach to claims directed to performing a novel and non-obvious underlying practice that did not previously exist (steps of a new game) with known manufactures (cards).

The ruling in *In re Smith* is wrong because a process that did not previously exist cannot qualify as an “abstract idea” under Step 1 of the *Alice* test. Furthermore, although we have not been told the definition of what it means to be “abstract” or for an idea



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to be an “abstract idea,” those terms logically cannot be said to apply to a novel and non-obvious process. A process that has never existed and is thoroughly described must logically transform an otherwise “abstract idea” into eligible subject matter under Step 2 of the *Alice* test.

Under the statute, new processes that use conventional equipment or materials are clearly patent-eligible subject matter. See 35 U.S.C. Section 100(b), which says that patent-eligible processes include “a new use of a known process, machine, manufacture, composition of matter, or material.” The Supreme Court has never abrogated Section 100(b), so it should be applied rather than ignored as if it doesn’t exist.

Regarding the game in *In re Smith*, it was undisputed that the claimed combination of game steps is new, as the USPTO found that the applicant overcame all Section 102 and 103 rejections based on the recited combination of such steps.

To fail the first step of the *Alice* test, a claim needs to tie up an “abstract idea,” which for purposes of this test was defined to be a preexisting practice that serves as a fundamental “building block of human ingenuity” such as a “longstanding” and “prevalent” economic practice. In conflict with the statute and the Supreme Court’s reasoning, the federal circuit panel in *In re Smith* applied the *Alice* test to claims that indisputably recite a new set of game steps that was not preexisting, let alone “fundamental.” The inventiveness of the claims was based on the previously unknown combination of game steps, not the cards.

Left uncorrected, the panel’s decision will be applied by patent examiners, the PTAB and district courts to create an improper categorical ban against patents claiming new games or similar inventive practices using conventional equipment. Such a categorical ban is contrary to the statute, controlling precedent and the USPTO’s own long history of granting patents on inventive practices using known equipment, including numerous game patents.

### Alice-creep

This type of *Alice*-creep is particularly disconcerting because it ignores the primary concern of the Supreme Court in *Mayo*. Much of the 101 patent eligibility mischief we now experience can be traced back directly to *Mayo v. Prometheus*, in which the Supreme Court ruled that conventional steps are not enough to transform a law of nature into a patent-eligible process. Although that decision clearly violates the statute, as well as directly overrules *Diamond v. Diehr*, the concern of the Supreme Court was undeniably and explicitly the additional of conventional steps.

In this case, the USPTO found the claimed combination of gaming steps was not preexisting. The patent examiner rejected the claims as being abstract because they were “an attempt to claim a new set of rules for playing a card game.” If the claims were a new set of rules, that means the steps could not possibly be conventional. If the steps were not conventional, then *Mayo*

shouldn’t apply at all. Given that the *Alice* framework is really the *Mayo* framework applied to abstract ideas instead of laws of nature, why should *Alice* ever be used to deal with a process that a patent examiner acknowledges is new, non-obvious and appropriately described?

It is difficult to understand how something that is described with enough specificity to satisfy 35 U.S.C. 112, which is also new and non-obvious, could ever be considered abstract. Of course, such an irrational conclusion can be achieved because the Supreme Court and federal circuit have stubbornly refused to define the term “abstract idea.”

How can you have a legal test that is applied to refuse property rights to applicants and to strip property rights from property owners, in which the critical term is intentionally left amorphous and undefined? Not defining the term “abstract idea” and yet applying it in the patent-eligibility context goes against everything the law is supposed to stand for: certainty, predictability and fairness.

It is well past time to define the term “abstract” so the law has meaning and those subject to the whimsical fancy of the current system can be spared. It is time for the innovators and the rest of the patent community to be informed as to the standards that will be applied.

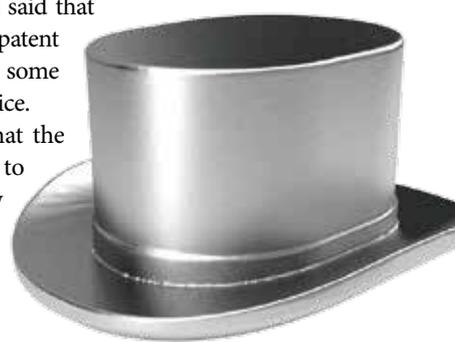
The term “abstract” is defined as “being apart from concrete realities, specific objects, or actual instances.” Defining the term “abstract” in this common-sense, everyday way makes it is easy to understand that when an application has specifically defined the invention with enough specificity to satisfy 35 U.S.C. 112, the claimed invention cannot possibly be abstract.

If you have enough information to evaluate whether what is being claimed is novel and non-obvious, how can you say that what is being claimed is abstract?

### An overreaching impact

It seems clear that with the right federal circuit panel (or wrong panel, depending upon your viewpoint), Monopoly would be patent ineligible because it is nothing more than an abstract idea. Of course, some would have you believe that the presence of a board and pieces would somehow transform the rules of playing the game into something that is not abstract. However, the Supreme Court’s decision in *Bilski v. Kappos* overturned the so-called Machine or Transformation test and said that it is possible for methods to be patent eligible without being tethered to some tangible physical apparatus or device. I find it impossible to believe that the Supreme Court intended *Alice* to rewrite generations of patent law applicable to the patentability of games, which were not at issue in that case. ☹

**Not defining the term “abstract idea” and yet applying it in the patent-eligibility context goes against everything the law is supposed to stand for.**





# Misleading USPTO Stats Hide a Hopelessly Broken PTAB

BOARD'S 'DEATH SQUAD' APPROACH AIDED BY LEGISLATION THAT HURTS INVENTORS **BY GENE QUINN**

**T**he **America Invents Act** is a horribly misnamed piece of legislation that leads the masses to believe it has been good for innovation, perhaps even supported by inventors. But when the AIA was being debated in Congress, independent inventors were not even given a seat at the table or invited to testify at any hearings.

Perhaps the most insidious piece of the AIA was the creation of three new post-grant procedures capable of stripping patent rights from patent owners. These lost patent rights are statutorily recognized to be property rights. Nevertheless, these property rights are being stripped by an arm of the Executive Branch of government instead of an Article III federal court. Worse, these property rights are being stripped by the same agency that examined the patents in the first place—the United States Patent and Trademark Office. The patent office has become a bit like an arms dealer: It sells patent rights to innovators who struggle for many years and pay tens of thousands of dollars to get patents, only to turn around and for tens of thousands of dollars more sell the right to challengers to take out those patent rights.

These post-grant procedures radically favor large multinational infringers by shifting the burden to the party least able to withstand that burden. For example, the most common of these procedures, inter partes review (IPR), initially left fewer than 5 percent of claims unscathed.

Though the patent office likes to tout statistics that assert most patent claims challenged in IPR are not invalidated, those statistics are not credible. When reporting its statistics, the office ignores the reality that once an IPR is actually instituted, few claims are actually adjudicated to be patentable. The office is also grossly misleading when it characterizes claims not subject to a final written decision as “remaining patentable.”

The USPTO and those who say IPR isn't all that bad seem to like to use the accompanying graphic. The red shows the number of claims found unpatentable in a final written IPR decision; the orange shows the number of claims canceled or disclaimed



by the patent owner; and the green, a tiny fraction of the overall number of claims, shows those patent claims that were actually adjudicated to be patentable by the Patent Trial and Appeal Board.

The patent office conveniently includes the large purple chunk of claims and refers to them as “claims remaining patentable and not subject to a final written decision.” The office can do this because the PTAB doesn't have to issue decisions that address all claims it agrees to consider. Technically those claims remain patentable, but those claims have not been determined to be patentable by the PTAB in an IPR. The

PTAB simply ignored those claims when writing its final IPR decision—astonishingly, something it is allowed to do, and quite frequently. It is hardly a ringing endorsement of the continued viability of those claims moving forward, particularly given that the PTAB leaves standing an initiation decision that determined that those claims are likely invalid. Thus, it is rather disingenuous to rely on those ignored claims to suggest IPR outcomes are not devastating to patent owners.

It is obviously impossible to license or enforce claims declared invalid by the PTAB, but it should be equally obvious that it is impossible to license or enforce a patent claim that was initially declared to be likely invalid and then later ignored by the PTAB in a final written decision. If those creating the patent office statistics don't understand how thoroughly compromised those initiated and ignored claims are, they should spend half a minute in the real-world shoes of patent owners.

Another problem with the office's statistics is that they do not keep stats patent by patent, but rather claim by claim. If the office collected data based on the patents affected, it would be close to the 90 percent range or higher. At issue here is the fact that every patent has multiple claims, some with 20-plus claims being challenged in each IPR. So if only one key claim were knocked out and declared invalid by the PTAB, that would be counted as an overwhelming patent owner success—when in fact, it could be a disastrous loss.



The patent office refers to the large purple chunk of claims above as those “remaining patentable and not subject to a final written decision,” but that characterization is misleading.

## The old shell game

Let's use an example to illustrate the ridiculous nature of USPTO statistics. Let's say the patent in question has 20 claims, three independent and 17 dependent. An IPR is filed, challenging all 20 claims. The PTAB decides to institute on 17 of those claims and declines institution on the three narrowest claims, which are not particularly useful anyway for licensing or enforcement. Let's further say that the PTAB ruled only the three independent claims to be unpatentable. Finally, let's say the PTAB didn't even address the other 14 dependent claims that were instituted.

The patent office would score this as a massive victory for the patent owner. Losing only three claims means that only 15 percent of the claims were declared unpatentable, while 85 percent of the patent claims remained patentable. The story that isn't told, however, is that 15 percent of the claims are deemed commercially non-viable, and 70 percent of the claims were initially determined to be likely unpatentable. That doesn't sound like a victory of any kind for the patent owner, does it?

In effect, what the office makes seem like a resounding victory for the patent owner becomes a complete loss when the lens of the real world is applied. The useful claims have been lost and 70 percent of the claims have a negative patentability initiation decision hanging over their head that remains unresolved. This patent is now dead. It has been defeated regardless of the parlor tricks and phony statistics reported by the patent office.

**When reporting its statistics, the patent office ignores the reality that once an inter partes review is actually instituted, few claims are actually adjudicated to be patentable.**

And things are worse than they initially seem. Although technically, those 17 claims remain patentable (i.e., the 14 claims ignored by the PTAB in its final written decision plus the three not instituted), they remain patentable as being subject to challenge without any estoppel. That means those claims, even if one or more of them were commercially useful, could be challenged again and again and again until there is a final written decision. Only with a final written decision would there be any estoppel that could be applied to prevent harassment of the patent owner, and then it would only apply to the party that lost and those in privity with the party that lost. In other words, patent owners are subjected to repeated post-grant challenges on the same prior art against the same patents and claims within those patents.

IPR kill rates are devastating. Calling the PTAB a "death squad" is today as appropriate as it was when that moniker was first given by then-Chief Judge Randall Rader of the United

*(Continued on page 44)*

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## PTAB 'ARBITRARY AND CAPRICIOUS' IN

# Denying Motion on IPR

FEDERAL CIRCUIT'S DECISION A VICTORY FOR PATENT OWNERS **BY GENE QUINN**

**T**he United States Court of Appeals recently fired a shot across the bow of the Patent Trial and Appeal Board at the United States Patent and Trademark Office, reversing the board's refusal to allow the patent owner to amend a claim in an inter partes review (IPR) proceeding.

One strongly debated aspect of post-grant trial practice is the board's near-blanket refusal to allow amendments to claims despite the fact that U.S. code law allows the patent owner to file a motion to amend. Until now, that law has been interpreted as allowing the right to file the motion but no right to actually amend. But the United States Court of Appeals for the Federal Circuit ruled that the board arbitrarily and capriciously denied the patentee's motion to amend in an inter partes review (IPR) proceeding.

The case is *Veritas Technologies, LLC v. Veeam Software Corp.*, 2015-1894. The patent at issue was U.S. Patent No. 7,024,527, owned by Veritas, which describes systems and methods for performing restores from backups while applications are active and accessing the data being restored. In October 2013, Veeam Software filed a petition asking the PTAB to institute an inter partes review of claims 1, 6, 8, 20, and 24 of the '527 patent, which Veeam asserted were unpatentable over prior art. The board instituted the review in April 2014.

After institution, the patent owner (Symantec Corp. at that time, but we will refer to it as Veritas) filed a conditional motion to amend, seeking to add new claims 26 and 27 if the board ultimately concluded that the challenged existing claims are unpatentable. In its April 2015 final decision, the board resolved the parties' claim construction dispute and ultimately found all challenged claims to be obvious under U.S. code law. The federal circuit affirmed the obviousness determination as being appropriate under the broadest reasonable interpretation of the claims.

The federal circuit, in an opinion authored by Judge Richard Taranto (who was joined by Judges Alan Lourie and Kathleen O'Malley), vacated the board's denial of Veritas's motion to amend. Judge Taranto explained: "The board was arbitrary and capricious in its sole ground for denying the motion." Accordingly, the federal circuit remanded the case to the board for further consideration of whether the proposed claims are patentable.

**"We do not see how the Board could reasonably demand more from Veritas in this case."**

—JUDGE RICHARD TARANTO,  
IN A WRITTEN OPINION

### Board's methods troubling

Although the obviousness ruling by the federal circuit is no doubt important to the parties, the issue that will be of most interest to the industry is the holding that the board arbitrarily and capriciously denied the patent owner's motion to amend.

In the final decision by the board in the IPR, the board denied the patent owner's motion solely because the patent owner did not discuss whether each newly added feature was separately known in the prior art. The board concluded that the motion and the declaration of Veritas's expert was insufficient because it did not discuss the features separately but discussed only the newly added feature in combination with other known features.

The federal circuit found that denying the motion to amend for this reason alone was unreasonable. In fact, after detailing

all of the evidence submitted by the patent owner, an exasperated Judge Taranto wrote: "We do not see how the Board could reasonably demand more from Veritas in this case."

The federal circuit appeared to be deeply troubled by the board's ruling, because requiring every limitation to be separately addressed seems to ignore the possibility that a claimed invention can be patentably nonobvious as the result of the combination of elements and limitations—not because of any single element or limitation in and of itself. Judge Taranto explained:

"Here, we have been shown no reason to doubt that it is only the combination that was the 'new feature,' a scenario recognized in a long line of Supreme Court and Federal Circuit cases noting that novel and nonobvious inventions often are only a combination of known individual features. In this case, we fail to see how describing the combination is meaningfully different from describing what is new about the proposed claims, even in comparison to the unamended claims. For that reason, we conclude that the Board erred in its sole reason for denying the motion to amend."

### Important caveats

As with any case that shines a ray of hope for patent owners, several caveats are worthwhile.

First, the patent owner here did submit quite a bit of evidence relating to the proffered claims so this case could be easily distinguishable. Second, this is not a blanket authorization to allow amendments to claims in an inter partes review but does show that there are limits to the board's authority to refuse entry of an amendment to the claims. Finally, as with all federal circuit decisions, there is always the risk that other panels will ignore this decision as if it never happened.

Time will tell the importance of this case, but it has to be viewed as at least some good news for patent owners. ☛



# Commerce IG Report:

PATENT EXAMINERS MAY HAVE DEFRAUDED GOVERNMENT **BY GENE QUINN**

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**T**he inspector general of the United States Department of Commerce recently released a scathing report titled “Analysis of Patent Examiners’ Time and Attendance,” which painstakingly details what appears to be widespread patent examiner financial fraud on the United States Patent and Trademark Office.

The investigative report—prompted by interest in the infamous “Examiner A,” who falsely claimed he worked 730 hours in fiscal year 2014—concluded that from Aug. 10, 2014, through Nov. 28, 2015, patent examiners submitted 288,479 hours that could not be supported or verified as being worked. These unsupported hours equated to \$18.3 million in overpayments.

According to the inspector general, a conservative approach to the evidence was taken to ensure that the amount of unsupported hours did not unfairly assume any particular examiner was not working when he or she claimed to be working. However, the report explains that a less conservative methodology would “have increased the total unsupported hours by an additional 327,000 unsupported hours,” making the total of unsupported hours 615,479—which would then correspond to more than \$39 million in overpayments to patent examiners.

Even using the conservative methodology ultimately settled upon by the inspector general, there are several findings that jump off the page of the report:

- Approximately 28.5 percent of the total unsupported time consisted of overtime hours.
- 415 patent examiners accounted for 43 percent of the unsupported hours, which if worked would have lessened the patent backlog by an estimated 15,990 cases.
- 310 of those 415 patent examiners received above-average annual performance ratings and yet accounted for nearly 98,000 unsupported hours.

- 56 of those 415 patent examiners claimed unsupported hours equivalent to three full days for every 80 hours or computer-related work time.

This shows hundreds of patent examiners are receiving high performance evaluations and yet apparently bilking the government. This alone is a serious indictment against institutional controls at the USPTO. If the patent office doesn’t even know what its stellar and above-average employees are really doing, what does it know about what other patent examiners are really doing?

## Production goals data

But wait, things get worse. The report alleges: “USPTO is paying production bonuses to examiners who are possibly defrauding the agency.” The report addresses this conclusion where it discusses examiner production goals, which are characterized as out of date and not reflective of current efficiencies. The report concludes that examiner production goals need upward revision, which will not be well received by the union or those patent examiners who have not been engaging in financial abuses.

The report explains: “The OIG’s (Office of the Inspector General) analysis—particularly the data regarding examiners who claimed a significant amount of unsupported hours and received high performance ratings—suggests that the USPTO’s production goals need revision upwards. As noted above, the majority of unsupported hours identified in the OIG’s analysis are associated with examiners who received above-average or exceptional performance ratings. In fact, the vast majority of the 296 examiners with 10% or more unsupported time during the 9-month period received “Commendable” or “Outstanding” ratings on their annual performance evaluations. Therefore, according to the USPTO’s rating system, their scores indicate that they are high performers who meet or exceed their production goals on a consistent basis.



They also received production bonuses for meeting their goals. Yet those examiners accounted for 42,384 unsupported hours, with 14,416 unsupported hours of that total paid as overtime.”

These findings suggest that those examiners met—or even exceeded—their performance goals by completing their work assignments in less time than allotted by their production goals. This calls into question the adequacy of those production goals and suggests that a potential abuse of time is possible because the production goals for many of the art units do not reflect efficiencies in work processes. The findings also suggest that the USPTO is paying production bonuses to examiners who are possibly defrauding the agency.

The production goals for examiners were adopted in 1976 and have been revised up several times, but not reevaluated. The report concludes this has made it easier for patent examiners to meet their production goals, even as technological improvements have facilitated patent review.

**The report alleges: “USPTO is paying production bonuses to examiners who are possibly defrauding the agency.”**

And just when things couldn't get any worse for the patent office, the report takes a swipe at office management: “[T]he sheer volume of unsupported hours suggests that the USPTO's internal control system used to monitor and prevent time and attendance abuse remains deficient.”

### The USPTO's response

In a prepared statement that responded to the inspector general's report, USPTO Chief Communications Officer Patrick Ross wrote that “This report serves as a resource in our ongoing efforts to improve.

“It is important to recognize and understand that the OIG report did not focus on individual employees; instead, it was based on a comparative analysis of large computer record data sets. The OIG concluded that there was a lack of a digital footprint in approximately 2% of the total hours claimed by the patent examiners during the 15-month period—a percentage that continued to shrink following the introduction of new USPTO controls, and during the course of the IG review. The USPTO recognizes that there may be many reasons for the lack of a digital footprint and is committed to analyzing the recommendations offered by the OIG, continuing to conduct our own review, and, if needed, improving the extensive measures already implemented.”

The office control mechanisms are deficient, and patent examiners seem to be defrauding the agency. It is also further proof of what has continued to come to light in recent weeks about how some patent examiners simply ignore office policy, ignore the Patent Trial and Appeal Board, ignore the U.S. Court of Appeals for

the Federal Circuit (preventing cases from reaching appeal), and issue bogus rejections with impunity. There seems to be a near-complete breakdown in institutional control at the patent office.

### Recommendations

Based on the findings of the investigation, the inspector general made the following recommendations:

1. The USPTO should reevaluate its examiner production goals for each art unit and revise them, to the extent necessary, to reflect efficiencies in work processes from automation and other enhancements.
2. USPTO management should require all examiners to provide supervisors with their work schedules, regardless of performance and ratings.
3. The USPTO should reinstate its requirement that employees use their USPTO-issued ID badges to exit the facilities through the controlled-access turnstiles during weekday working hours.
4. The USPTO should require all teleworkers to remain logged into the USPTO network during their working hours when the network is available to the teleworker.
5. The USPTO should review its policies, procedures and practices pertaining to overtime hours to identify and eliminate areas susceptible to abuse.
6. The USPTO should consider deploying SOHO routers by all teleworkers.

### Conclusion

There is no doubt that many—likely the vast majority—of patent examiners take their jobs very seriously. I know patent examiners who are very conscientious and struggle to meet their production goals because they do a good job and do not simply issue frivolous rejections. As with so many cases of abuse, those who are abusing the system will make it that much more difficult for everyone else. This is why the patent office must regain control and establish a new culture.

Management has absolutely no institutional control over patent examiners, as evidenced by struggles to get patent examiners to allow patents and follow office guidance and policy. That being the case, this story about patent examiners committing financial fraud on the patent office rings true and fits within the narrative that we know. Patent examiners doing whatever they want feeds the ongoing narrative of an office that is out of control.

Patent examiners fudging time sheets or even outright submitting fraudulent time sheets is further proof that some examiners can and do get away with whatever they want. The office seems incapable of doing anything about it on any level. But as much as we can and should point to a lack of certain institutional and management controls, the real problem is that the USPTO cannot realistically fire anybody even for cause. It is more difficult to fire a federal government employee past their probationary period than it is to fire a tenured professor. Unless and until that changes, or unless and until the patent office brings back the old practice of imposing internal exile upon those who refuse to follow office policy, nothing productive or useful will be accomplished. ☛

# USPTO Director Sued for Declaring Federal Holiday

COMPANY SAYS ACTION ALLOWED IPR FILING AFTER STATUTORY DEADLINE

BY GENE QUINN

**L**ast Dec. 22, around 7 p.m., the United States Patent and Trademark Office experienced a catastrophic failure of electronic information systems due to a major power outage at the office's headquarters in Alexandria, Virginia. Power that comes into the USPTO main building feeds two power filtration systems that provide steady, filtered power to control against power surges. A malfunction in that power supply caused significant damage to both systems, causing the failure of both the main and backup systems.

With all USPTO electronic systems down, USPTO Director Michelle Lee declared December 22-24, 2015, a federal holiday within the District of Columbia. The USPTO announcement, in pertinent part, read as follows:

"In light of this emergency situation, the USPTO will consider each day from Tuesday, December 22, 2015, through Thursday, December 24, 2015, to be a "Federal holiday within the District of Columbia" under 35 U.S.C. § 21 and 37 C.F.R. §§ 1.6, 1.7, 1.9, 2.2(d), 2.195, and 2.196. Any action or fee due on these days will be considered as timely for the purposes of, e.g., 15 U.S.C. §§ 1051(b), 1058, 1059, 1062(b), 1063, 1064, and 1126(d), or 35 U.S.C. §§ 119, 120, 133, and 151, if the action is taken, or the fee paid, on the next succeeding business day on which the USPTO is open (37 C.F.R. §§ 1.7(a) and 2.196)."

According to the patent office, Director Lee seems to have relied on some unspecified power under 35 U.S.C. 21(b), which says:

"When the day, or the last day, for taking any action or paying any fee in the United States Patent and Trademark Office falls on Saturday, Sunday, or a Federal holiday within the District of Columbia, the action may be taken, or the fee paid, on the next succeeding secular or business day."

The director of the USPTO does not have the authority to declare a federal holiday. Federal holidays are created only by Congress and signed into law by the president. Only 10 federal holidays have been created. Not even the president can declare a federal holiday, although by executive order he can close an executive agency or give workers a half day—as is customarily done on Christmas Eve or if the day after Christmas falls on a Friday.



**In retrospect, the proper thing for Director Michelle Lee to have done after a major power outage at USPTO headquarters would have been to declare an emergency under the powers vested in her.**

In retrospect, the proper thing for Director Lee to have done would have been to declare an emergency under the powers vested in her by 35 USC 21(a), under which the director of the USPTO can declare that a paper was filed on a day that it would have been filed but for a disruption in mail service or emergency. A catastrophic failure of transformers at the USPTO that brought down all electronic systems would seem to qualify as an emergency, given that more than 99 percent of all filings sent to the USPTO arrive via electronic filing.

The net effect of Director Lee having declared an emergency, which she clearly has the power to do, is that any filing would have been treated the same as under the Saturday, Sunday or federal holiday rule. I explained this all in an article last Dec. 29 and urged the USPTO to clarify that Director Lee had not created a new federal holiday, but rather declared an emergency. The USPTO was made aware of the article, but no such clarifications were issued.

## Details of the lawsuit

On Aug. 12, Elm 3DS Innovations, LLC, sued Director Lee and the USPTO in the United States District Court for the Eastern District of Virginia. The company argued that it was aggrieved by her declaring a federal holiday without any authority to make such a declaration.

The problem created by Director Lee's decision relates to the tardy filing of an inter partes review (IPR). Elm 3DS Innovations sued Micron Technology, Inc.; Samsung Electronics Co., Ltd.; Samsung Semiconductor, Inc.; and SK hynix Inc. (and various associated companies) in the U.S. District Court for the District of Delaware, alleging that they had infringed certain aspects of Elm's patents. The defendants were served with the complaint on Dec. 24, 2014. Pursuant to 35 U.S.C. 315(b), this means any IPR had to be filed on or before Thursday, Dec. 24, 2015, or the petition would be time barred. The defendants filed their IPR petitions on Monday, Dec. 28, 2015.

*(Continued on page 44)*

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## Misleading USPTO Stats Hide a Hopelessly Broken PTAB

(cont. from page 39)

States Court of Appeals for the Federal Circuit and warmly embraced by then-PTAB Chief Judge Smith, who admitted that if the PTAB were not acting as a death squad it would not be doing its job. It's astonishing he would say that, given PTAB judges are administrative patent judges—the patent office equivalent of an administrative law judge.

Judges are supposed to be neutral, but that has never seemed to be the PTAB approach. Recently I heard a story told by a former PTAB judge who explained that institution of IPR challenges is far more likely when there are multiple petitions filed against the same patent, because it makes it easier for PTAB judges to meet their production quota.

I don't know the proper name for the legislation, but it certainly isn't the America Invents Act. All the AIA does is make it harder for innovators, weakens the patent system and pushes inventors to keep their inventions as trade secrets hidden from society. The AIA has been and will continue to be a disaster of our own making until it is either repealed or significantly revised to the point where it bears little resemblance to the bill that was signed into law by President Obama five years ago this September. ☞

**In effect, what the office makes seem like a resounding victory for the patent owner becomes a complete loss when the lens of the real world is applied.**

## USPTO Director Sued for Declaring Federal Holiday

(cont. from page 43)

Elm 3DS Innovations argues in the complaint filed that the IPR petitions would be considered untimely but for Director Lee declaring Dec. 22-24, 2015, federal holidays. Elm is correct, of course.

Elm is asking the Eastern District of Virginia to declare that Dec. 22-24, 2015, were not federal holidays and that Director Lee acted outside the scope of her statutory authority in her declaration. Furthermore, they are asking for a declaration that by accepting the IPR petition outside of the statutory deadline to file the petition, Director Lee acted outside of her statutory powers. Elm is also looking for a declaration forbidding the USPTO from continuing to implement Director Lee's declaration of Dec. 22-24, 2015, as federal holidays.

Why Director Lee relied upon some unspecified power she clearly does not possess instead of a power she clearly does possess is a mystery. The law is enormously clear. Unless the Eastern District and ultimately the United States Court of Appeals for the Federal Circuit decide to ignore the law, the outcome of this case is easy to predict. Director Lee will be found to have lacked the authority to declare a federal holiday, and the IPR petitions filed on Dec. 28, 2015, will be time barred. ☞

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## INVENTIVENESS

### They wrote

A few years ago, the Washington Post asked readers for their suggestions on how to encourage U.S. inventions:

"We must allow education to become free, open source & available to everyone." Educational content needs to be localized, technology available to all children, and language barriers in education eliminated.

"Restore copyright/patent law to its original intent of providing a LIMITED monopoly and for a LIMITED period of time."

Systemic processes that encourage everyone to come up with innovative solutions "should become part of any big company in the U.S., because it turns their own employees quickly into inventors just by shortening the leap of invention with some handy thinking tools."



The Baby Mop is a onesie with mop pieces attached to help crawling babies clean and polish floors, from BetterThanPants.com. Although the company says the product helps teach babies about cleanliness and a strong work ethic, some parents are skeptical. Others say using the outfit keeps germs too close to the baby. We say: Don't fire the housekeeper.

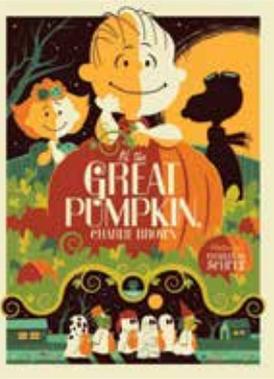
### Wunderkinds

Creating a first prototype is often challenging, but **Cassidy Goldstein** did it by accident. At age 11. While trying to use crayons that were broken, making the pieces too small to hold, she searched her arts and crafts supplies and found a small plastic tube meant to keep flowers fresh during shipping. She inserted a crayon piece into the tube, and drawing became easy.

She filed an application and received a utility patent for Crayon Holders in 2002. Her father, Norman Goldstein, helped her get a licensing deal in which she receives a 5 percent royalty on all sales. He also founded By Kids For Kids to help youths in the invention and commercialization process.

## 50%

The percentage of patent holders surveyed in 2005 whose inventions came as a result of "serendipitous" processes—i.e., accidents. The findings are in the book "Inventology," by Pagan Kennedy. The survey also found that the biggest source of inspiration comes from those who are actually going to be using the finished product, and two-thirds of patents arise from some form of collaboration.



## WHAT DO YOU KNOW?

**1** Happy 50th, "It's The Great Pumpkin, Charlie Brown!"

**True or false:** Peanuts characters and related

intellectual property are 60 percent owned by the Charles M. Schulz family.

**2** Which invention came first—the cellphone, or the CD?

**3** Which of these was not a patented invention by Mark Twain?

- A) Adjustable garment strap
- B) Scrapbook with pre-gummed pages
- C) Historical facts board game
- D) Handheld paint mixer

**4** **True or false:** Apple patented an infrared blocker to prevent picture-taking and videos inside concert venues.

**5** When was basketball invented?

- A) 1919
- B) 1866
- C) 1891
- D) 1933



### ANSWERS

1. False; 20 percent. The other 80 percent is owned by Iconix Brand Group, which has a joint venture with the family called Peanuts Worldwide LLC. 2. The CD was invented in 1965 by James Russell, the cellphone in 1973 by Martin Cooper and Motorola. 3. D. 4. True. The technology, patented in June, would emit a signal that hits every iPhone. 5. C (Dr. James Naismith; the first game was 9-on-9).

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