

the disruptors

He came.
He sawed.

He took On^{the} whole power- tool industry

Why wasn't anyone
else interested
in building
a safer saw?

By Melba Newsome
Photographs by Robbie McClaran

IN FEBRUARY 2001, Stephen Gass strode to the podium in a conference room at Caesars Palace in Las Vegas and began the video presentation for SawStop, his new invention. The 75 attendees watched the screen closely as a woodworker fed a sheet of plywood into a power-saw blade spinning at 4,000 rpm. Then a hot dog was placed in the path of the blade. Miraculously, the instant the blade made contact with the wiener, the saw shut down and the blade retracted. The dog escaped with only a small nick—substitute a finger and it's the difference between a cut and an amputation.

Gass had given the same dog-and-pony show a dozen times, mostly for woodworkers, contractors, and a few industry executives. But this audience was different. It consisted of lawyers for the Defense Research Industry, a trade group for attorneys representing the power-tool industry. SawStop could help prevent thousands of serious injuries caused by power tools each year, Gass believed—if the industry would license it. He returned to his seat thinking he had made his case.

Then Dan Lanier, national coordinating counsel for Black & Decker, stepped to the podium. His topic: "Evidentiary Issues Relating to SawStop Technology for Power Saws." Lanier spent the next 30 minutes discussing a

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hypothetical lawsuit—in which a plaintiff suing a power-saw manufacturer contended the saw was defective because it did not incorporate SawStop's technology—and suggesting ways defense counsel might respond. Lanier recalls it as a rather dry exploration of legal issues. Gass heard something different. To his ears, Lanier's message was this: If we all stick together and don't license this product, the industry can argue that everybody rejected it so it obviously wasn't viable, thereby limiting any legal liability the industry might face as a result of the new technology. (Lanier denies this was his point.)

Gass was stunned. His tiny start-up, run by three guys out of a barn in Wilsonville, Oreg., had captured the attention of the entire power-tool industry. For months, he had been negotiating with major players such as Ryobi, Delta, Black & Decker, Emerson, and Craftsman about licensing his invention. Instead, they seemed intent on trying to make him and his product go away.

SOME 32,000 AMERICANS are rushed to emergency rooms with table-saw-related injuries each year, according to the Consumer Product Safety Commission; more than 3,000 of those visits result in amputations, usually of fingers or hands. The medical bill to reattach a severed finger runs from about \$10,000 for a clean wound to more than \$25,000 if there's nerve damage, infection, or other complications, according to James W. Greer, president of the Association of Property and Casualty Claims Professionals, a trade group in Tampa. Factor in rehabilitation and lost time at work, and the cost per injury can easily reach six figures. Indeed, in 2002, the CPSC estimated the annual economic cost of table-saw injuries to be \$2 billion. That's more than 10 times the size of the entire \$175 million table-saw market. Clearly, this is an industry that could use a better mousetrap.

That's what Gass figured he had in the summer of 2000, when SawStop's technology made its debut. A year later, the Consumer Products Safety Commission awarded the device its Chairman's Commendation for product safety. *Popular Science* magazine named it one of 100 Best New Innovations. Tool industry bigwigs seemed impressed too. "It is probably one of the most major developments in the area of product safety applicable for table saws," said Peter Domeny, director of product safety for S-B Power Tool, which makes Skil and Bosch tools.

So, four years later, why isn't SawStop on every table saw on the market? That's the funny thing about better mousetraps. Build one, and the other mousetrap makers will probably hate your guts. They might even try to squeeze you out of the mousetrap business altogether. Just ask the inventors of air bags, safer cigarette lighters, and automatic shutoffs for electrical appliances—all of which encountered resistance from the status quo. Ultimately they prevailed and their innovations became standard. Gass still has a long way to go.

Gass didn't set out to take on the power-tool industry. Nor did he ever see himself as an entrepreneur. The amateur woodworker was standing in his workshop one day in 1999, staring at his idle table saw. "The idea came to me that it might be possible to stop the blade quickly enough to avoid serious injury," he says. A patent attorney who also holds a doctorate in physics, Gass loves nothing more than solving complex technical problems. He got out pencil, paper, and calculator and got to work.

Stopping the blade, he figured, would require a two-part process. First, he needed a brake that would work quickly enough when it came into contact with a woodworker's hand. Next, he

had to design a triggering system that could differentiate between finger and wood. Given the speed of the blade, it would have to stop in about 1/100 of a second—or at about an eighth of an inch of rotation after making contact. Any further, and the cut would be so deep that the device would be useless. To stop the blade this quickly would require about 1,000 pounds of force to decelerate the blade in 10 milliseconds. That calculation took Gass about 30 minutes. The trigger problem was a little more complicated, but Gass came up with the idea of running a small electrical charge through the blade. The system would sense when the blade hit flesh because the body would absorb some of the charge. The resulting drop in voltage would be enough to trigger the brake and stop the blade almost instantly.

Gass spent two weeks designing the technology and, using a \$200 secondhand table saw, an additional week building a prototype. Then he began to experiment. With the blade whirring, he touched his hand to its smooth side. It stopped immediately. The same thing happened when he ran a hot dog into the blade's teeth. Gass repeated the experiment dozens of times—and each time the blade stopped immediately. Convinced his invention would be embraced by the industry, he videotaped a demonstration, registered the patent, and set out to convince manufacturers to license the technology, which he had dubbed SawStop. He sent a video demo to Delta Machinery in Jackson, Tenn., one of the largest table-saw manufacturers, and waited.

Gass was pleased with his results, but he also knew there was something else to be done: He had to test SawStop on a real finger. "There's not a lot of demand for a saw that's safe for hot dogs," he says with a laugh. And so, on a spring afternoon in 2000, Gass stood in his workshop and tried to summon the moxie to stick his left ring finger into the teeth of a whirring saw blade. He had rubbed the digit with Novocain cream, hoping to dull the pain of the cut. On the first try, his heart beating furiously, he eased in close but recoiled before making contact. A few minutes later, he tried again. This time, he rolled his finger close enough to get a faint red mark, but panicked and pulled back before the brake triggered. By now, his forearm was cramping from the tension. It was difficult to keep his hand steady. Still, on his third attempt, he kept his nerve—and the blade stopped, just as he knew it would. "It hurt like the dickens and bled a lot," he says. But the finger remained intact.

Several months later, Gass finally heard back from Delta. "No, thanks. Safety doesn't sell," he says he was told over the phone. (Delta, now known as Delta Porter Cable, is now owned by Black & Decker. A Delta spokesperson who asked not to be identified denies that a Delta employee made the comment.) Gass could not believe his ears. "Everybody in woodworking knows somebody who's lost a finger or had an accident," he says. How could a major manufacturer not be interested?

Gass refused to give up. Working with three other lawyers from his Portland law firm, David Fanning, David Fulmer, and David D'asenzo, he raised \$150,000, built a more sophisticated prototype, and signed up for the International Woodworking Fair in August 2000 in Atlanta. The reaction there was phenomenal. SawStop's booth was packed with spectators who stood riveted as Gass





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and his partners fed wiener after wiener into the table saw. “Afterward, these guys would walk up to us and say, ‘I wanna shake your hand for doing this,’” recalls Fanning. “A lot of them were shaking with two or three fingers missing.” It was all the validation the four men needed. A month later, Gass and Fanning walked away from law partnerships to pursue SawStop full-time. Fulmer, an associate at the firm, followed a few months later. D’asenzo invested in the venture but kept his day job.

The fall of 2000 was hardly an auspicious time to launch a start-up. The Internet boom had just gone bust, the Nasdaq was in free fall, and investors were gun-shy. Yet SawStop was so practical and easy to understand, the trio had little trouble raising \$1.2 million in angel funding from several different investors. They in-

CLOSE SHAVE
Upon contacting
flesh, SawStop saws
shut down in 1/100
of a second.

vested in more R&D, better prototypes, and small salaries for the three principals. “It was a no-brainer,” says Grant Simmons, a New Orleans urologist who invested an undisclosed amount in SawStop after reading about the company

and seeing a video demonstration in 2004. It was Simmons’s first experience as an angel investor, and his interest was more than just financial: His father was a lifelong woodworker who had lost a finger in a table-saw accident. “This is revolutionary,” Simmons says. “They are applying basic physics in a practical way to address a very important issue that people in the industry have totally ignored—safety.” Gass, Fanning, and Fulmer, meanwhile, filed more than 50 patent applications to protect their invention.

The only thing they lacked was industry cooperation—but that seemed inevitable. After all, they believed, common sense and consumer demand ultimately would win out. What’s more, the technology had implications far beyond table saws. It could potentially boost the safety of all power saws, including band saws and circular saws, as well as nail guns, lawn mowers, and other products. For the next two years, the partners engaged in what seemed to be promising talks with high-level executives at Emerson, Black & Decker, and Ryobi. In January 2002, they appeared to have turned the corner when Ryobi agreed to license SawStop’s technology. Under the terms of the deal, there would be no up-front fee; Ryobi would pay a 3% royalty based on the wholesale price of all saws sold with SawStop’s technology. The number would increase to 8% if the majority of the industry also licensed the technology. It was

not a get-rich-quick deal, but Gass believed it was a vital first step.

When the contract arrived, Gass noticed a typo and called Ryobi’s attorney, Bob Bugos, to make the correction. Gass says Bugos apologized and promised to take care of it right away. (Ryobi representatives declined to comment for this story.) When a week passed and the revised contract still had not arrived, Gass called back. He says Bugos was very apologetic and assured him the contract was on its way. Again, it didn’t come. Gass says he called every two weeks and each time Bugos made the same promise. After about six months of going back and forth, it finally dawned on Gass that the Ry-

obi deal, like all the others, was going nowhere.

INDEED, THE MAJOR power-tool manufacturers have professed to be somewhat less than impressed with SawStop. “The device has not been field-tested for results, durability, and reliability,” said a representative from Delta Porter Cable. “It’s an experimental system, not yet field-proven.” According to Dan Lanier, the Defense Research Industry attorney, all of the manufacturers approached by Gass independently tested and evaluated the technology. And each one, Lanier said in an e-mail, encountered “significant problems.” “The primary problem,” he said, “was an unacceptably high rate of false trips of the braking device when cutting wet, green, or pressure-treated lumber.” The industry, Lanier added, is also

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wary of the fact that even when the device works, the user still walks away with an injury. "Manufacturers discovered that, depending on the accident scenario and the type of blade used, a user even with a properly functioning SawStop-equipped table saw still could sustain a very severe injury," Lanier said. "Mr. Gass's hot dog demonstration simply is not representative of the way in which many table-saw accidents occur." Given those issues, manufacturers also felt that the 8% royalty sought by Gass was "exorbitant and unreasonable," Lanier said. (Representatives from Ryobi, S-B Power Tool, WHM Tool Group, and Emerson did not return repeated calls seeking comment.)

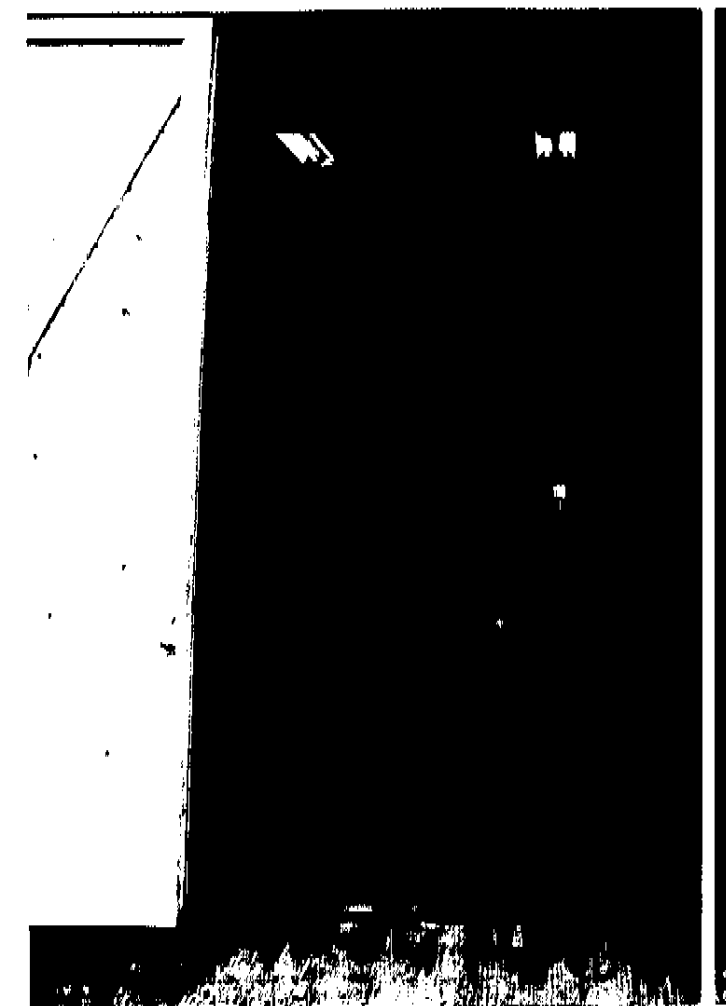
Gass counters that the industry tests were conducted on unrefined prototypes—models essentially built to demonstrate that the concept worked—and that many of the problems Lanier cites have since been addressed. On current models, most wood needs to dry for only an hour or two before being cut, he says. As for the fact that SawStop can result in an injury even when it works, Gass asks the following question: Isn't it better to walk away with a cut, even a deep one, than to lose a finger or a hand? "I think they were looking for reasons not to implement it," he says.

Gass sees the objections as a smoke screen for the industry's real concern: the increased risk of product-liability litigation. In most cases, when people sue power-tool manufacturers because they've lost a finger or hand in an accident, they're unsuccessful—because it's tough to prove that the manufacturer did anything wrong. Add SawStop to the mix, however, and the picture changes. Suddenly, the industry is promising an injury-proof saw. What if someone got hurt? "The manufacturer would be at a deeper risk and more vulnerable because it had made a promise of what the technology could do," says Jim O'Reilly, a product-liability expert at the University of Cincinnati. "Companies are going to be reluctant to expose themselves to that higher risk."

Indeed, precisely who would assume that risk turned out to be a major sticking point in SawStop's licensing negotiations. The manufacturers believed Gass should indemnify them against any lawsuit if SawStop malfunctioned. Gass, however, says that he could not possibly make such a guarantee since he would not actually be manufacturing the saws. And there is another facet to the liability issue. If SawStop did come to market and was proved effective in preventing accidents, it might be easier for plaintiffs to win lawsuits against manufacturers of traditional saws, because juries might be more likely to return a verdict against a manufacturer that chose not to implement SawStop. That's the main reason, Gass believes, that the big tool makers are refusing to deal with him. They want his product to go away.

AFTER THE DEAL with Ryobi fell apart in mid-2002, Gass, Fanning, and Fulmer faced a tough choice: Abandon the company and return to practicing law or build the saws themselves. None of the men had ever run a company, but they all understood that it's one thing to be an inventor and another to be an entrepreneur. They would be responsible for designing, manufacturing, marketing, and sales along with the day-to-day operations of a business. It was a tough prospect—but not a tough decision. All three agreed that if they didn't act, their technology would never see the light of day. "It seemed like the right thing to do," says Fanning. "There aren't very

WORLD HEADQUARTERS
Gass and his seven
employees work out of
a two-story barn Gass
built himself.



many opportunities to make money and do something good."

With wives and kids to support, Gass and his partners have found that the decision has not always been easy to stand by. Gass fondly recalls the six-figure salary he earned as a patent lawyer. At one point, he was so close to returning to his legal career that he got quotes for renewing the legal-malpractice insurance policy he dropped when he devoted himself to SawStop. "I never doubted my invention or wanted to give up, but I've wondered if we would be able to keep going," he says. "It's been touch-and-go several times with money, and we always manage to pull through at the last minute."

SawStop now operates with eight people out of a two-story barn Gass built himself. Filled with electronics, high-tech machinery, and every tool imaginable, the first floor is a handyman's paradise. In the corner is a large stack of woodworking timber left untouched since Gass launched his venture. Gass logs 12- to 14-hour days running the business upstairs. Desks, computers, and filing cabinets fill the second-floor office space. A map of the United States hangs above the conference table. It's dotted with colored pushpins, each one representing a city where someone has purchased a SawStop table saw.

The first one rolled off the assembly line of a Taiwanese manufacturing plant in November 2004. SawStop has since sold about 600 and has 300 more on back order. A basic contractor saw retails for \$799; the professional-level cabinet saw goes for \$2,500. The company relies on trade shows, news stories, word of mouth, and ads in woodworking magazines for marketing. Selling online and direct-to-consumer is an acceptable way to get started, but Gass knows that to reach the larger market he will need to get into home improvement stores, where competition for shelf space is fierce. He's had discussions with Home Depot and Lowe's, but neither has committed to carrying the product.

So for now, Gass is banking on people like Sharon and Don Biers, owners of Collins Custom Cabinets. After one of the employees at their Lowell, Ark., shop lost a finger in a power-saw accident in February, the Biers bought a \$2,500 SawStop cabinet saw and have

an opposing brief in which it argued that SawStop is a "speculative and untested technology. In addition, the cost to consumers and manufacturers of granting the petition would far outweigh any benefits that may be realized." The industry also claims to be developing its own safety systems. The CPSC is expected to release its findings this summer. If it states, as Gass hopes and expects, that the technology is effective, it will be the first step in a long process of making SawStop—or a similar injury-prevention system—mandatory.

Meanwhile, the industry's product-liability fears appear to be coming to life. In 2003, a construction worker walked into the Wellesley, Mass., office of attorney Richard J. Sullivan. He was looking for someone to represent him in a case against Chicago-based S-B Power Tool. The worker had lost his thumb and four fingers while using a table saw. Doctors were able to reattach them, but even after six surgeries and \$150,000 in medical bills, he still had no real functionality in the hand. Living on workers' comp, he fell behind financially and was forced to sell his home.

Sullivan turned the case down twice because he didn't see a way to hold the manufacturer accountable. Then a colleague told him about SawStop. "His injury occurred on a saw manufactured in April 2003 and sold in May 2003," Sullivan says. "The industry has known about this technology since 2001. That gave the manufacturer plenty of time to react." The lawsuit, filed in Massachusetts state court in the summer of 2004, alleges that the man-

ufacturer was negligent for not implementing the technology and seeks compensation for lost wages, future lost wages, and pain and suffering. (Attorneys for S-B Power Tool responded in January, denying all claims.) "If Gass can figure this out by tinkering around in his backyard, what has this industry been doing for the past 20 years?" asks Sullivan, who has since taken on five similar cases. "They're like the auto industry, which had to be dragged kicking and screaming to install air bags."

Gass believes that Sullivan's cases are only the tip of the iceberg. "The legal standard says you have to make a product as safe as you reasonably can, and if you fail to do that, you're going to be responsible," he says. While Gass wants SawStop to be successful financially, he also admits that what began as an interesting physics problem in his workshop has become something of a crusade. "This is important to society and that responsibility weighs on me," he says. "It would have been so much easier if the manufacturers had just licensed this. Then, having SawStop would be just like having a stereo with Dolby or running shorts with Gore-Tex." Indeed, Gass still dreams of getting out of manufacturing altogether. He really doesn't want to make the power tools we buy. He just wants to make the power tools we buy better. **G**

Melba Newsome (melbanewsome@bellsouth.net) is a freelance writer in Charlotte, N.C.

"Accidents are usually caused by human error, but this saw grants you forgiveness," says one contractor.

since ordered two more. It didn't take long for the purchase to pay off. Within two weeks, another employee, John Stroud, inadvertently shifted his hand into the path of the blade and the saw shut down when it hit his fingernail. "We made the calculation that it's worth it for the safety of our guys," says Sharon Biers. "The accidents are usually caused by human error, but this saw grants you forgiveness." And not just for professionals. In May, Gass received an e-mail from a high school shop teacher in Princeton, Wis. "I have a sophomore who still has two thumbs thanks to your saw," the man wrote. The company knows of at least five other amputations that have been averted.

With the big tool companies declining to participate, SawStop is seeking other ways to make sure its technology is adopted. In April 2003, the company filed a petition with the Consumer Product Safety Commission to make SawStop-like technology standard on all table saws. Six months later, the Power Tool Institute, a consortium of 17 power-tool makers, filed