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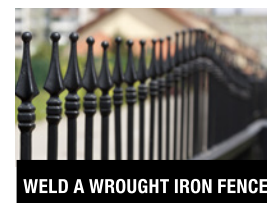


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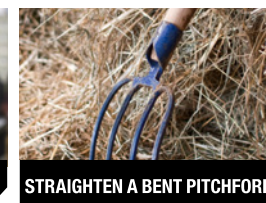
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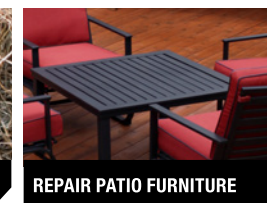
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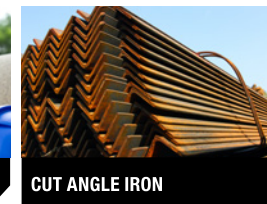
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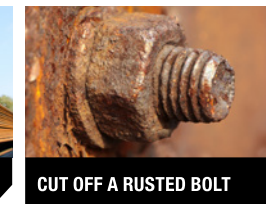
HEAT A FROZEN LOCK



SOLDER WATER PIPES



CUT ANGLE IRON



CUT OFF A RUSTED BOLT

LETTER FROM THE EDITOR

THE EXTRA MILE

► By the time you read these words, Thanksgiving will be nearly upon us and another year will be quickly winding down. Hopefully, 2021 was a bit more normal for you than the prior year, and hopefully you – as well as your family and friends – are heading into the holiday season in good health and good spirits.

For many of us, the events of the past two years have raised our awareness of the needs of our respective communities. That could include the folks in our immediate city or town, or it could mean a more geographically wide-ranging group of people with whom we share common interests. However we define community, many of us are continuing to find ways to lend a hand.

Jim Bollinger, the subject of our cover story in this issue of ARC, is someone who keeps giving back. He's the frontman – and essentially the sole proprietor – of a fabrication business he calls DoRite Enterprises. In addition, he teaches welding at conventions and seminars and on his popular YouTube channel. He's so good at what he does that he's been called upon to work as a fabricator for a number of maker-themed TV series.

But just in case fabricator, teacher and go-to guy for the entertainment industry weren't enough gigs to fill a resume, Jim has also worked as a firefighter, EMT and engineer for the City of Orlando for 26 years. No matter which hat he's wearing at any given moment, he's always ready to go the extra mile.



"I'm always thinking about how to build things better," he says. "I'll say, 'Jim, you could get away with a two-by-four here, but a two-by-six would be a lot sturdier, especially during a hurricane... My approach might take a little longer or cost a little more. But if it means not having to redo the job later, then I believe it all was worth it.'"

One gets the sense that Jim's approach to building is a metaphor for his approach to life in general.

If you find Jim's story motivational or even inspirational (and who wouldn't?), maybe you're thinking about adding some new gear to your current array of welding and fabrication equipment. If so, we can help you turn your holiday wish list into a reality. This issue of ARC also includes our 2021 Holiday Gift Guide, which checks in with a few other talented influencers – Cynthia Gauthier, John Malecki and M.J. Zilla –

and provides a glimpse of some of the Lincoln Electric equipment and accessories they use every day. We're pretty confident that you'll come across something in the gift guide to jump start your passion for welding, fabricating and making.

As we do every year, we wish you all the best this holiday season, and we hope your new year is happy, healthy, productive and prosperous. See you in 2022!

— John C. Bruening, Editor-in-Chief
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The communication channel is always open at ARC Magazine, and we welcome your feedback about what you see or what you'd like to see on these pages.

Contact us at editor@arcmagazine.pub or publisher@arcmagazine.pub.



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Measure Twice, Cut Once

Whether fighting fires, teaching welding or fabricating for cable-TV shows, Jim Bollinger vows to DoRite by others.

By Jeff Herrington

Jim Bollinger strolls alongside a pontoon boat he's inherited from a family member, a vessel he's dubbed the *S.S. Minnow*. During a recent family outing, one pontoon took on a wicked amount of water and he's trying to determine why.

The camera Bollinger's using to record his inspection wobbles at times, but his insight into the boat's malfunction is solid. Turns out, a crack has formed near a supporting bracket.

Bollinger continues to walk and record, then stops at the next bracket. He zooms the camera in on a gloppy mess that surrounds its base.

"Now, *somebody*," he says, "calls that a weld."

And you just know a zinger is coming.

And sure enough, the zinger arrives.

"Me?" he continues, with just a wisp of sarcasm. "I call that dog crap somebody's flung with a slingshot."

With that attitude tucked snug into Bollinger's tool belt, it should be no surprise that this firefighter, welder and YouTube influencer calls his fabrication business DoRite Enterprises. Says Bollinger, "I'm always thinking about how to build things better. I'll say, 'Jim, you could get away with a two-by-four here, but a two-by-six would be a lot sturdier, especially during a hurricane.'"

He adds: "My approach might take a little longer or cost a little more. But if it means not having to redo the job later, then I believe it all was worth it."



Bollinger's been like this forever. He can't recall when he hasn't had the maker's bug. As a boy, he was enthralled with the engineering of the many crop dusters that flew low over his grandparents' farm north of Orlando. Then there's the Christmas Eve when he took apart – and then reassembled – all the toys he'd received.

"I wanted to see how they worked," he explains.

That childhood wonder evolved into hands-on knowledge around age nine, when a family friend offered to teach him arc welding. "It was all rocket science," he recalls, "but I quickly understood that when I learned how to weld, that's when I could build."

Five years later, he took the money he'd earned mowing lawns and bought his own welder.

"To run it, I had to bootleg power from the clothes dryer," he says, "so we couldn't dry clothes and weld at the same time. And I was always scavenging for parts. There wasn't a lawn chair or bed frame alongside a curb that was safe."

Bollinger was hooked, and eager to learn more. Over time, he added stick, TIG and MAG welding – along with working in plastics – to his fabrication repertoire.

However, adult life eventually came a-calling, so Bollinger pursued a career as an EMT. After stints with a few smaller fire departments, he joined the Orlando Fire Department, where he's served as a firefighter, paramedic and engineer for 26 years.

Typically, Bollinger worked 24 hours on, 48 off. But he'd frequently spend his free hours in the department's fleet garage, run by Terry Cullen. It didn't take long for Cullen to see Jim had a knack for taking things to the next level.

"Once, I suggested to Jim that we annually replace the pull ropes that start our circular saws," Cullen remembers. "We were going through them like crazy, sometimes during an emergency. Instead, Jim found a pull rope made of Kevlar. It cost more, but was far more durable. After we replaced our old ropes with the Kevlar ropes, not one broke."

"I'm amazed at Jim's energy level and work ethic. He always gets elbow-deep into a project and hammers it out until it's not just done but done right."

Bollinger attributes much of his commitment to doing things right to Cullen. "Terry's father was a military veteran who had a motto I've really embraced," he says. It goes, "It goes, 'The difference between mediocrity and excellence is usually less than ten minutes of work.'"



Shortly after Cullen left the Orlando Fire Department, Bollinger found an additional outlet for his fabrication expertise – cable television. He volunteered in the art department of *Extreme Makeover: Home Edition* during its third season and instantly impressed the show's production designer, Nancy Hadley.

"Working with the show, I'd met hundreds of craftspeople across the country," she says. "I quickly knew Jim's skills were equal to those of the best I'd encountered. He was always game to build whatever I needed and deliver it within seemingly impossible deadlines."

Bollinger even applied his paramedic skills on the set. "I was using a gas-powered chainsaw, inside an open container, to carve flexible foam into a frog sofa for a child's room," Hadley recalls. "Jim noticed my lips turning bright red and understood carbon monoxide was building up inside the container. He stopped the carving and probably saved my life."

Hadley has hired Bollinger for other maker-themed shows, including *BattleBots*, *Kitchen Nightmares*, and *Bar Rescue*, for whom he's produced everything from an aluminum chandelier for a Palm Beach nightclub to a wall inside a pilot's home made from part of a Boeing 737.

However, it's Hadley's impact on Bollinger's personal life that's probably been the most meaningful. The producer had a hunch her co-worker, Michele, might be Jim's romantic match.

She was right. The couple have now been married 13 years and are parents to three boys.

"I'm happy for them and happy to recommend Jim," Hadley says. "His calm approach to solving problems is a wonder to behold and an asset to teams seeking the highest skills in fabrication."

"The guy you see on YouTube is the same guy I know personally."



Bollinger has discovered he can also be an asset to industry newbies seeking the highest skills in fabrication. While working on *Extreme Makeover: Home Edition*, he forged a close bond with Lincoln Electric. In turn, the company has tapped him to lead welding seminars at company events and industry trade shows.

But sometimes Bollinger creates his own teaching opportunities. Stan Zinkosky owns Bar Z Industrial Development in Southern California, and every year, he stages a confab of YouTube-featured machinists that's called the Bar Z Summer Bash.

"Jim called me out of the blue one day and said he was coming to the bash and wanted to teach a welding seminar," Zinkosky recalls. "I had no clue who he was, but the boy can talk. So, I said, 'Sounds great.'"

"The crowd loved his humor and anecdotes, along with his expertise. Except for last year's virtual bash, he's instructed at every event since."

Like most of his talents, instructing seems to come naturally to Bollinger.

"My parents, and my wife's parents, are teachers. And my wife's degree is in primary education. So I guess educating runs in the family," he says. "However, I'm 100-percent self-taught. I burned everything I could find, including myself, to learn how to weld. When I was growing up, the only way to learn was to read a book, go do it and keep screwing up until you did it right."

"I hope by breaking a topic down so it's easier to understand, those who are turned off by welding's technical aspects will feel less intimidated and give it a try. It really fulfills me when someone takes my class, and you see the spark in them get lit."

That's when you know they've just learned something about themselves. That's when they've learned that what they are doing . . . is something they really love."

Given his popularity as an in-person instructor, it was only a matter of time before Bollinger launched his own YouTube channel. "I was encouraged by a television producer who said my on-camera presence was impressive," he recalls. "Still, I was pretty nervous at first. It helped that a church friend shot the first videos, and that we filmed them in my shop. Eventually, though, I moved to a GoPro to shoot videos in the field."

Of course, Bollinger taught himself the GoPro. But it's the unfiltered, spontaneous vibe that makes his videos so alluring. If he drops an endcap during a shoot, the fumble stays in the final cut. If he 'mistakenly' calls his in-laws 'the outlaws,' that stays in as well. And his cats, turkeys, chickens and children invariably photobomb while he's teaching.

But the 100-plus videos he's uploaded also provide serious, step-by-step instruction on such diverse topics as how to build a pergola, repair a steam tractor or insulate one's shop with foam.

Bollinger believes his newfound YouTube popularity is helping him enrich the fabrication industry, both now and for the future.

"YouTube lets me teach what I teach in person but make it funnier and more interesting to a younger generation," he says. "It helps me inspire more people to get into their garages, shops and barns and build something."

Although the videos have boosted Bollinger's recognition factor, Terry Cullen insists they haven't changed him as a person.

"The guy you see on YouTube is the same guy I know personally," he says. "Except, the guy in the videos enunciates his words better."





To know Jim Bollinger personally is a gift, his friends claim. Sales executive Brad Hill has enjoyed a best friend/wingman relationship with Bollinger for more than 20 years. In the '90s, Hill kept running into Bollinger at a line-dance bar in downtown Orlando. "I didn't think much about him at first," he admits. "But with his white cowboy hat, and his six-foot-four-inch height, it was hard to miss him."

Since then, the duo has chased girls, fixed swamp buggies and hunted hogs together. In Hill's eyes, Bollinger's stature has only grown.

"Many years ago, he helped me lift a Chevy Silverado I had bought and finished it in under a day. And recently, he repaired the tires on my daughter's car. He's that kind of guy."

But then Hill chuckles as he reflects on Bollinger charity and adds, "Sometimes, though, I wonder if he's just looking for an excuse to buy some new tools."



Bollinger's last ride with the Orlando Fire Department comes in January 2022. He's years from full retirement, but he imagines it will take place on a farm in the mountains of North Carolina or Tennessee, with plenty of acreage for his kids and grandkids to run and ramble on. He'll probably tend a garden, he says, but will likely lease out the fields for others to farm.

Will he continue to weld and fabricate?

"Oh, there'll definitely be a shop," he says, "for if you take away my tools, you take away my spirit. Most likely, when they find me dead, it'll either be at my welder or with a screwdriver or lathe handle in my hand." **ARC**



QUESTION MARK



ARC taps into the vast experience of veteran tradesman, educator and author Mark Prosser (CWI/CWE). In addition to many years as a welder for the automotive and motorsports industries, Mark has also spent the last 15 years teaching welding at the college level, where he fields challenging questions from his students every day. He shares some of those questions – and his answers – with ARC in every issue.

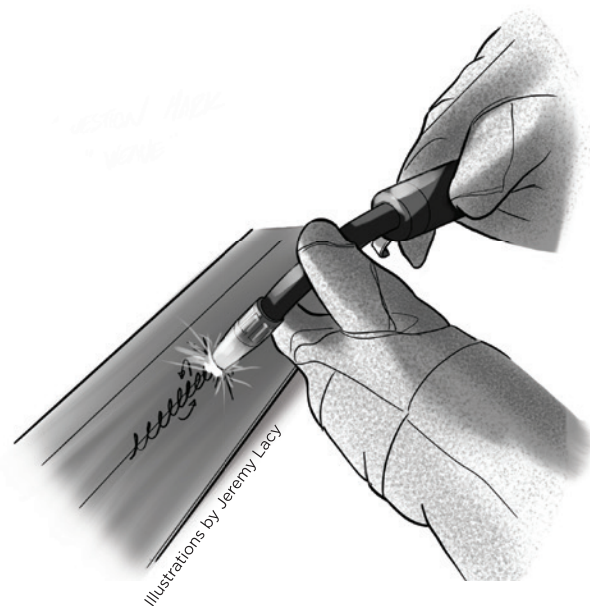
Should I use a weave technique when I weld?

► There are several different techniques used with different welding processes. Welding instruction books currently on the market talk about various weaving techniques (inverted V, concave, convex, etc.), box techniques, figure eights, J hooks, whip and pause, and so on. The names of the techniques are often reflective of the patterns themselves, and some take time to learn correctly. Whatever we call them, the objective of every technique is to pull heat from one area of the puddle and disburse it to another area as needed. Understanding which technique works best for the welding job at hand can be a valuable skill, because one technique does not fit all situations. Material thickness, type of joint, and weld position are some of the variables that dictate which technique is most appropriate. The ultimate objective is to manipulate a molten puddle to counteract gravity's tendency to pull the puddle out of the joint.

I generally tell beginners to think less in terms of specific techniques and their various names and concentrate more on the basics: balancing arc lengths, travel speeds, gun/torch angles, body positioning and range of motion. Once you learn to balance these critical factors, then you can start to consider what specific techniques might enhance your welds.

Should my contact tip on my MIG gun be recessed in the nozzle or sticking out?

► The answer depends on a couple factors. We know that there are different types of metal transfer modes such as short circuit, spray, globular and pulse transfer with more sophisticated power sources. The positioning of the contact tip in relation to the end of the nozzle changes with these transfer modes. For example, when MIG welding in a spray transfer, much more heat is generated onto the contact tip than when welding in short-circuit mode. Each welding transfer mode requires a different distance of the contact tip to the work. Most of the MIG welding done in our home shops is what we consider short-circuit transfer welding, and spray is used for thick materials and large welds. With short-circuit, the contact tip should stick out past the end of the nozzle up to an 1/8-inch. This allows the operator to see the tip better in order to maintain the proper contact to work distance. Many welding gun nozzle setups are fixed: you simply screw them into a position that's usually flush with the rim of the nozzle. Some recess the nozzle as you tighten them into position. So generally speaking, the contact tip should not be recessed, because you need to be able to see it in order to maintain consistent contact tip to work distance and consistent amperage.



Illustrations by Jeremy Lacy



Illustrations by Jeremy Lacy

Why do my stainless welds change color as I weld? What color should they be?

► The question of color always arises when welding stainless. We've all seen some great looking stainless welds with beautiful colors, and we might wonder why we can't seem to get our welds to look that clean.

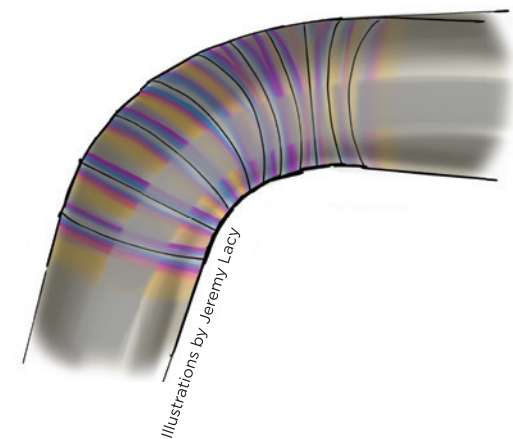
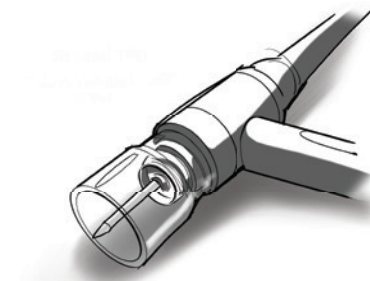
The coloring is the result of chromium oxide in the weld. Some folks like the look of those blue/reddish/purple welds. From an aesthetic standpoint, that's great, but in some applications, it's not acceptable. For example, a custom stainless pipe on a motorcycle will function perfectly with blue looking welds. The coloring does not affect the quality of the weld in any way. But that same weld coloring would not be acceptable on an aerospace part.

The coloring happens because the weld is not cool enough before the cover gas is pulled away. Try using a gas lens on your TIG torch instead of a regular collet body. The next thing to try would be a larger gas lens to release a higher volume of gas. I personally weld stainless on the low side of the amperage range with a slower travel speed. This allows the weld to cool to a lower temperature while still being covered by the gas, which will result in better color.

Is it necessary to grind a groove into the metal when repairing a crack in a part?

► Most welding or repair jobs boil down to one important question: How thick is the material? You also need to ask what type of metal you're welding and what process you're using to weld it. For example, if you're working on 16-gauge material on a lawnmower deck, you probably don't need to grind the crack out. Simply running a weld over it will penetrate enough. If the material is 3/16-inch thick or thicker, then some grinding will be necessary in order to get as much penetration as possible into the base metal. The thicker the material, the more grinding will be necessary to get to the root of the weld. And the grinding process can be tricky, because it's easy to blow a hole through the material by grinding too much away. If you have access to the back side of the work piece, grinding and welding the crack can be done from both sides for full penetration. If you don't have access to the back side, the groove needs to be a little bigger on the front to enable your weld to reach deeper into the material.

In general, if you grind a crack out to three-quarters of the material thickness, you should be able to fuse it well. So the short answer is yes, typically we grind cracks out before welding, but the need to grind depends on the welding process and the material type and thickness. Just be careful not to grind all the way through, so as not to create more work for yourself.



Illustrations by Jeremy Lacy



Illustrations by Jeremy Lacy

SHOW US THE ONE
WHO SHOWED YOU THE WAY

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ARC
MAGAZINE



2021 Holiday Gift Guide

'Tis the season to be giving. Or asking.

If you're a welder/fabricator, or if you have one on your holiday shopping list, you might be on the lookout for some new gear for the coming year. We happen to know some people who can provide you with a healthy shot of inspiration. ARC checked in with a few high-profile influencers – Cynthia Gauthier, MJ Zilla and John Malecki – and each of them gave us a glimpse of some of the Lincoln Electric equipment and accessories they use every day.

These are builders and makers who take their work very seriously, so be sure to take a close look. There's probably something in their shops that would be just as useful in yours.





Cynthia Gauthier

Canadian born Professional
Monster Truck Driver, TV Host
on @ZoneVL, Crossfit Athlete
and Welder/fabricator

instagram: CynthiaGauthier

twitter: CynthiaGauthier

New York-based artist,
designer and entrepreneur

instagram: mecjagger

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MJ Zilla



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2021 Gift Guide

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K3269-1



POWER MIG® 260
K3520-1



Square Wave® TIG 200
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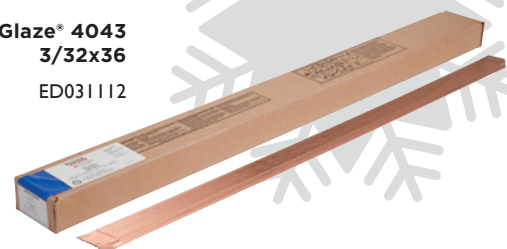
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SuperGlaze® 4043
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2021 Gift Guide



Tomahawk® 625 Plasma Cutter
K2807-1



Tomahawk® 375 Air Plasma Cutter
K2806-1



VIKING® 3350 Code Red® Welding Helmet
K4034-3



XLR P100 Half Mask Respirator
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Caliber TIG Torch - 17 Series with expendables
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Premium 7 Series Elkskin Stick/MIG Welding Gloves
K4787-Size



XVI Series Industrial FR Cotton Welding Jacket
K4931-Size



FR Welding Cap - Black and Red
K4818-Size



Magnum® PRO Curve™ HDE 250 Welding Gun
K4531-2-6-45

Standard Welding Gear Ready-Pak®
K4416-M,-L,-XL,-2XL,-3XL



Finish Line™ Clear Indoor Welding Safety Glasses
K2966-1



4 x 16 Row Carbon Steel Welding Wire Brush
K3185-1

Premium Welding Gear Ready-Pak®
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SHOP TRICKS AND TOOLS

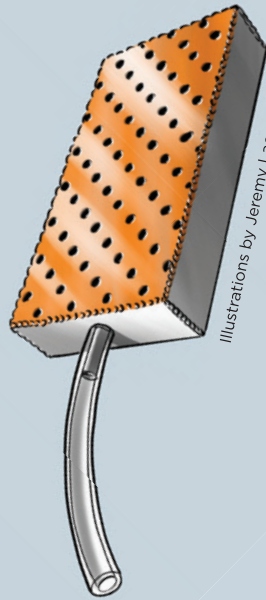
ARC brings you time-saving, money-saving ideas to improve the quality of your projects and the process by which you complete them.

PURGE BLOCKS FOR PURGING STAINLESS TIG WELDS

► If you're learning to weld stainless butt joints, you want to provide some gas coverage to the back of the weld to reduce or eliminate the "sugaring" effect - the burnt-looking crust on the back side of the joint. Building a purge block is pretty easy and only requires a few pieces of material, some layout tools, a center punch, small drill bits, some stainless TIG filler, a thin copper plate and a copper or stainless gas feed tube. These blocks can be constructed in any configuration you need for the weld you are performing.

The first step is to lay out a grid pattern on a 1/16-inch copper plate in 1/4-inch blocks. This is where the small holes will all be drilled. The rest of the box can be made from 1/16-gauge stainless. We use copper on the side of the block where the weld will sit to avoid welding to the block. Flat square blocks are good for flat position welding, but triangular shaped blocks can be built for corner welds too. You can construct the box any way you need to. After you've drilled the gas holes, remove any burrs from each hole and weld the copper gas plate to whatever shaped stainless box you built. You can weld copper to stainless with the TIG process and a compatible stainless filler (309L for dissimilar metals). Weld all the seams to prevent any air leaks.

The last step is to drill a hole that will enable you to slide a copper or stainless tube in for the gas feed line. It seems like a bit of work, but these purge blocks can be used repeatedly and can be very effective. You can buy blocks, but you can save some money by building your own specifically for the desired application.

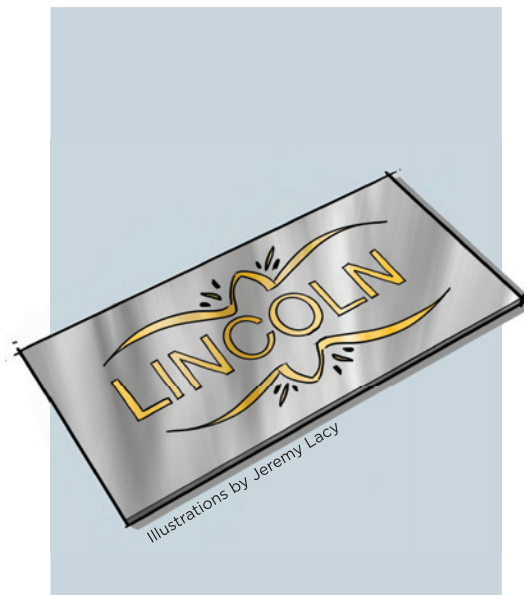


Illustrations by Jeremy Lacy

BRASS INLAY FOR METAL

► This a great technique to create a simple decorative enhancement in your metal surface. The first time I saw this was on a set of metal stamps used for identification purposes. The steel was stamped with letters, numbers or simple designs. Then an oxy-fuel torch with flux coated brazing rod was melted and used to fill the letters, designs or divots in the metal. After cooling, the brass was then sanded off to the base metal. The brass stayed in the stamping and created a beautiful looking gold inlay in the metal.

An engraving tool can be used to create different designs in the metal and filled with brass. It's important get the design or stamp deep enough to accept the melted brass. The base metal never gets hot enough to melt the steel - only the brass, which has a much lower melting temperature than steel. Larger grooves can be cut into the metal with a grinder to create a decorative look. You just have to make sure the groove is filled with the brass. Avoid using a hard grinding disc to finish the brass. Use an 80-grit sander instead, and gradually move up in grade. The brass will polish up nicely and make an attractive addition to any part or metal project.



Illustrations by Jeremy Lacy

TUCKING TOOL FOR SHRINKING SHEET METAL

► When working with sheet metal, we sometimes want to build something more than just flat-sided projects. One of the most effective tools for putting shape into your sheet metal is a shrinker/stretcher. This can be a pricey item, but you can build your own simple tucking tool that will work fairly well. Tucking tools are used to add curvature to a work piece by pulling the molecules in the metal together. A tucking tool can be made very easily, and when it's used with a body hammer and a dolly, it can put quite a bit of curve into your sheet metal. The tools can be made in various sizes and configurations.

Start with a 6-inch piece of 3/8- to 3/4 -inch solid round bar and cut a slot into one end about an inch deep and about 1/16-inch wide. Cut another piece of round stock to weld onto the end to create a T handle. Slide the edge of the sheet metal into the end of the tool where you made the kerf. The tool is simply used like a wrench: twist, reposition, twist and keep repeating this process down the edge of the sheet metal to create small folds in the metal. The process will make the edges of the sheet metal look like an old bottle cap. This will pull the metal together and gradually create a curvature in the panel.

Once you've finished twisting and making the folds, work the edges of the material with a hammer and dolly to flatten all the folds. This process will begin to create a little bit of shape in the panel.

A tucking tool is fast, easy to build, easy to use and effective. Give it a try if you need a little shape in your sheet metal.



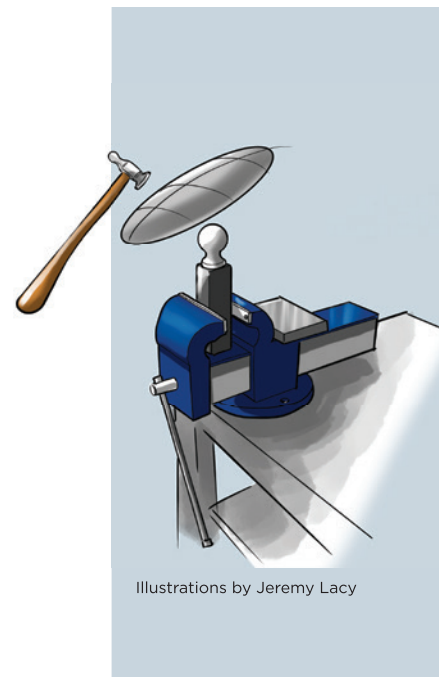
Illustrations by Jeremy Lacy

TRAILER BALL POST DOLLY

► Trailer balls can be found just about anywhere, or you can buy a new one for a few bucks. Post dollies are handy for any shop that has metal in it - especially if you might be building the tucking tool featured elsewhere in this column. Post dollies are excellent for working sheet metal and make a handy tool for other tasks.

A ball and a 1-foot-long small square tube that the ball sits flat on is welded around the edges. This tool can be clamped into a vise vertically or horizontally, depending on what works for you. Or it can be used as a straight hammer, which might come in handy for tight places like the trunk of a car - maybe reach a dent that a regular hammer just won't reach. Post dollies can be made in all sizes with different shapes and edge configurations to accommodate a variety of applications. They're effective because their high crown creates a smaller contact area - which in turn creates more force on the metal being dollied. A high crown dolly moves metal more quickly and easily than a bigger, flatter dolly with a larger contact area.

With a good body hammer, a tucking tool and some practice, you can use the post dolly to either straighten out a curved panel or put some curve in a flat panel. Only hammer the metal on the dolly until the metal is flat. Continuing to hammer after it is flat will cause shrinkage in the metal. The tone of the hammer hits will change when the metal is flat on the dolly. When you hear the change in sound, the metal is flat between the hammer and the dolly. It's best to stop hammering at this point, or you'll risk stretching the metal and getting different results than what you'd intended.



Illustrations by Jeremy Lacy

EDUCATOR SPOTLIGHT

CLINT PARKER

SHORT TERM, BIG PICTURE

By John C. Bruening

For Clint Parker, learning and achieving are all about setting goals and eventually hitting the mark. It's a lesson he learned when he was a student at Missouri Welding Institute (MWI) in Nevada, Missouri, in the late 1990s. More than twenty years later, he teaches that same lesson at that same school.

After graduation, Parker logged a few years as a welder in a variety of settings – nuclear power plants, refineries, food processing, “a little bit of everything,” he recalls. He returned to his alma mater in 2005 to teach welding, and has since taken on a more administrative role as MWI's president and director of training.

As an instructor, he's taught just about every welding process: stick, TIG, MIG, flux-core and more. Despite the big-picture demands of his job more recently, he still maintains a presence in the classroom.

“I tell our students from the very beginning, ‘You're coming here to learn how to weld, but what's the true reason why you're coming here? You need to have a goal.’ That's what I was told when I came here as a student. Welding is going to provide a lot of things for you, but you're going to hit a brick wall at times, and you're going to wonder if this is the right choice for you.”

The secret to getting past that brick wall, he says, is to break your long-term goals into shorter-term plans.

“The question I often ask students is: What do you want out of welding? Do you want a hundred acres? Do you want a hundred head of cattle? Do you want \$100,000? I tell them to make a two-year plan for themselves, or a five-year plan. Even if they don't make that goal on schedule, they're working toward it. It gives them a drive. So when they hit a rough time, when they're struggling with a particular welding technique or they're trying to master a certain position, that's what keeps them going. That's what drives them.”

Kaleb Rook was one of those students who made it past the brick wall and established a successful career – not unlike the one Parker forged for himself. Rook graduated from MWI in 2005 and took Parker's instruction and wisdom into the real world. He worked as a welder for eight years before returning to the school in 2013 to teach the trade.

“I think the world of Clint,” says Rook. “He's one of the best guys you'll ever meet as far as an instructor and a boss. He's very level headed.”

Rook says Parker's most memorable lessons – then and now – were about humility.

“The main thing I remember him telling us is, ‘Don't forget where you came from, and try to give back.’ The other rule he taught me is, ‘Don't ever think you know it all.’ Because in this industry, I don't know anybody who does. ‘Don't ever get too comfortable. Always be on your toes. Always try to learn.’ Those were the things that I always remember Clint teaching. They're things that I still tell my students – and myself – to this day.” **ARC**

“HE'S ONE OF THE BEST GUYS YOU'LL EVER MEET AS FAR AS AN INSTRUCTOR AND A BOSS.”

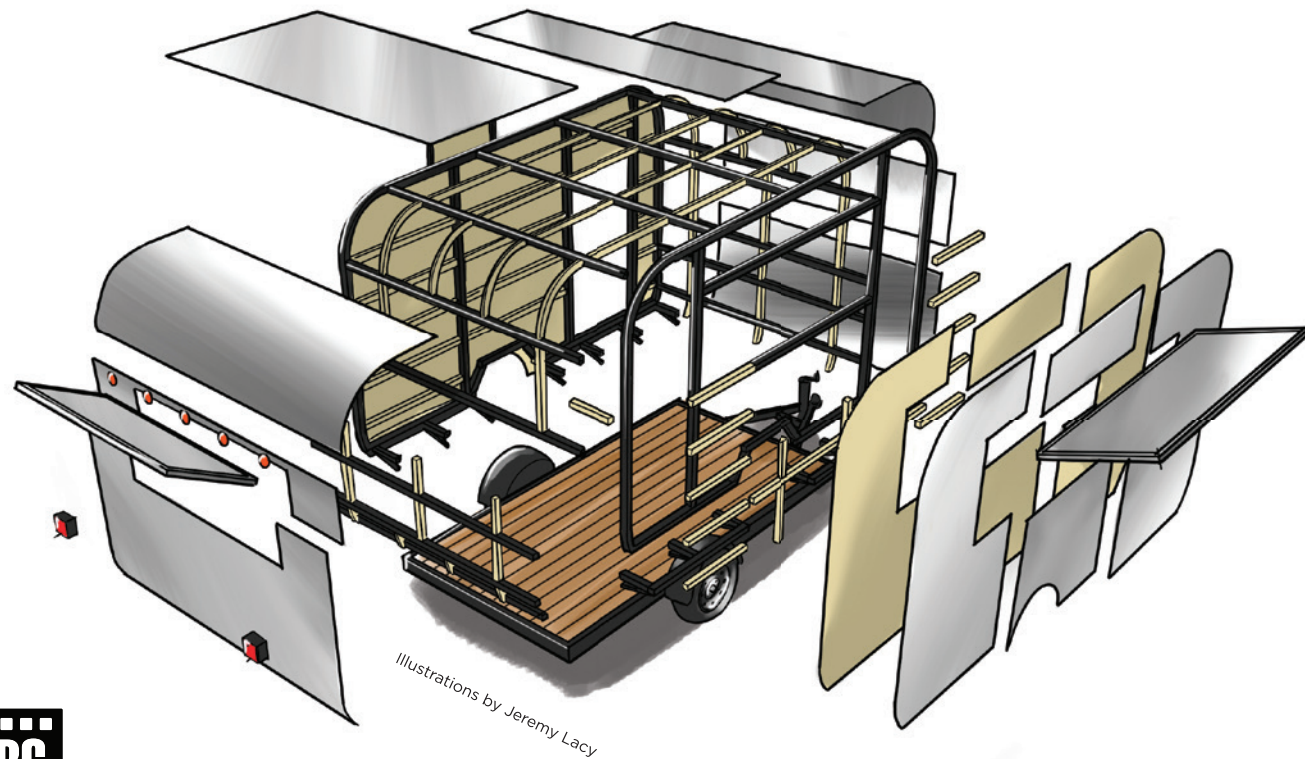


Photo by Brian Wade

Project Spotlight

TRAILER EXTERIOR FOR FOOD PREP AND SERVICE

By Jimmy DiResta



Watch exclusive footage at arcmagazine.pub

Although the summer of 2021 is in the rear view, there are still plenty of opportunities for foodie entrepreneurs – especially those in warmer climates – to take their business on the road. This build – commissioned by a client who provided a schematic before we got started – turns a 6 X 12-foot flatbed trailer into an 8 X 12-foot unit that will

house small cooking and refrigeration equipment to provide mobile food service for concerts, festivals and other outdoor events.

This one was admittedly a venture into the unknown. It was a very big build, one of those “get outside your comfort zone and see what you can do” projects, and I feel like I delivered.



Illustrations by Jeremy Lacy

STOP SAFETY FIRST

Before you start any project involving welding, make sure you have the right Personal Protective Equipment (PPE), which includes, at least, an ANSI-approved welding helmet, safety glasses, appropriate welding gloves for the process you're using, and a flame-resistant shirt, jacket, or sleeves to protect from UV rays and burns. You should also keep a fire extinguisher close at hand. Use adequate ventilation when welding. Use an approved respirator if exposure to welding fume cannot be controlled, or if welding outside and natural air movement is not sufficient to keep welding fume out of your breathing zone.

MATERIALS

- 10 24-foot pieces 2x2-inch 16-gauge tube
- 5 10-foot pieces of 90-degree aluminum trim
- 15 sheets of .040-inch aluminum
- 10 sheets of 1-inch steel tubing
- Stainless steel hinging
- 10 24-foot pieces of 2x2-inch wood
- 15 sheets of 1/8-inch plywood
- An abundant supply of epoxy and construction adhesive

WELDING/CUTTING EQUIPMENT AND TOOLS

- Lincoln Electric Power MIG® 140 MP®
- Lincoln Electric Square Wave® TIG 200
- Reciprocating saw
- Angle grinder
- Large cast-iron right angles

Important: Consult your local regulations prior to fabricating a trailer to ensure your trailer complies with all applicable laws. Your local regulations may require different or additional features, and they may require permits or licenses prior to use.



Imagery © Jimmy DiResta



Step 1:

Cut away the unnecessary accessories and extensions from the sides of the basic frame. This will facilitate the widening of the frame to the width of the wheel well – which will create another two feet of width to the overall footprint. Use the 2-inch tubing to build the frame out to the 8-foot width of the wheel wells, per the client's schematics. If space in your shop allows, draw the layout in actual size on your shop floor.

Step 2:

Use the angle grinder to cut the tubing pieces to build the rest of the frame. Double them up on the template etched in your shop floor, since you're essentially building two identical and symmetrical sides at the same time. Use two-inch dies to cut the tubing that will serve as the outside belt that will shape the curved portion of the trailer structure. Position all parts – straight and curved – on the shop floor layout and connect them all with tack welds. Then go back and weld and grind all of the joints when you're sure everything is straight.

▶ A detailed drawing and cut list for this project can be downloaded at arcmagazine.pub.

Step 3:

Clamp the two side walls into place on the trailer floor, level everything up, and weld the side walls down. Weld the struts along the width of the trailer, front and back, to connect one side wall to the other. Continue check as you weld to ensure that all pieces are level to themselves and level to earth.

Step 4:

Cut and insert wood 2 x 2s within the metal framework to create the wall paneling structure. Use a combination of screws and epoxy to secure the 2 x 2s in place.



Step 5:

Cut the wood curves for the front and back – top and bottom – from two layers of 3/4-inch plywood. Glue the curved pieces together and reinforce them with screws. Once the curves are in place on the frame, use a combination of screws and glue to attach the larger 1/8-inch plywood panels along each side of the frame and eventually the roof to create the substructure. Cut out the window sections after the panels are attached and fully dried.

Step 6:

Use adhesive to attach the aluminum panels to the wood surfaces of the substructure. Attach the panels in a layered fashion (like a shingles on a roof) to accommodate the airstream when the trailer is moving forward on the road. Cut the aluminum panels away from the window spaces.

Step 7:

Cut and TIG weld the 1-inch steel tubing to make the open-and-shut panels for the doorway and the service areas. Glue the 1/8-inch plywood to the frames and flush-cut the excess away. Cut the stainless steel hinges into foot-long segments (three for the long door and two for each of the service hatches) to attach the door and hatches to the frame. Weld the door and hatches into their respective positions. Glue the aluminum sheets to the roof, making sure to use the same overlap as the side walls. Glue aluminum panel to the outer surface of the door and hatches.

Step 8:

Complete all finish work. Cut the aluminum trim to fit the perimeter of the door and hatches. Attach the final aluminum panels to the curved sections along the top of the trailer at the front and rear. Use pop rivets where needed to hold various panels in place, especially the aluminum trim around the door and hatches. (A more complete and evenly spaced series of pop rivets can be attached later.) Drill holes for the taillights on the back of the trailer and insert grommets and lights. Attach door latch to door.

Art and Technology Bring Sculpture to Life

By John C. Bruening

Sometimes the creative process is solitary and organic. Other times, a dose of technology and engineering, along with a few extra pairs of hands, are required to make the vision a reality. *Convergence*, a 28-foot-tall and 12-foot-diameter sculpture created by artist and designer Jenny Sabin and her team at Jenny Sabin Studio, represents what happens when a team of creators, engineers and local trade workers come together for a common purpose.

Recently installed on the Northwall Plaza at the University of Nebraska Medical Center in Omaha, the 5,000-pound sculpture is made from a combination of wire arc additive manufactured stainless steel, CNC machined polycarbonate panels, stainless steel rings and 3M Dichroic Film. *Convergence* celebrates UNMC's "thriving, vibrant and rich heritage of excellence," says Sabin, an associate professor of architecture at Cornell University and principal of Jenny Sabin Studio.

Although she has extensive experience with robotic multi-axis 3D printing of clay, Sabin admits that "printed steel was a new step forward for us." Some outsourcing was in order.

After conceptualizing the sculpture as a whole, Sabin submitted CAD files to Lincoln Electric's additive manufacturing team, who used SculptPrint OS™ software to separate the overall structure into nine subsections and identify the optimal 3D printing process and

sequence. The subsections were printed at Lincoln Electric's headquarters in Cleveland, and then shipped to Omaha, where they were assembled in more traditional fashion by local fabricators.

"I had not worked with Lincoln Electric prior to this project, but I was somewhat familiar with what they've been doing in wire additive manufacturing," says Sabin. "So we started looking into that, and I was really impressed from our very first conversations with them. There just seemed to be a real openness and excitement about the project...It also became very clear that Lincoln is at the forefront of this technology, so it quickly became a very good fit. So that's why I decided to work with them."

The *Convergence* sculpture lives up to its name on a number of levels. Among other things, it's the product of a new partnership that Sabin is interested in exploring in the future.

"There's so much R&D that goes into engaging in not only a new collaboration, but in an entirely new process," she says. "There's so much learning through that, and now there's the opportunity to build upon that and do something even bigger and better. So I hope to keep the collaboration with Lincoln Electric alive and look for other opportunities to work together." **ARC**



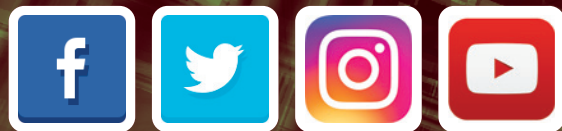
Photo by Jesse Winter



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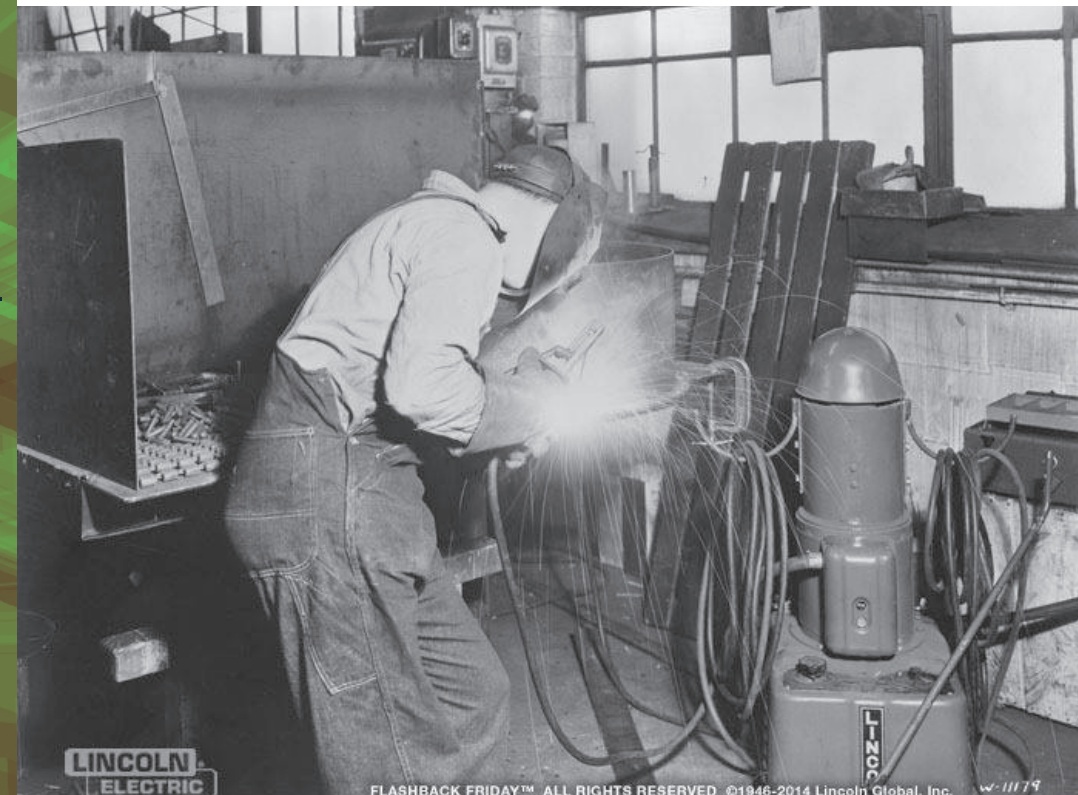
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Flashback

Strong Connection



▶ June 1946

A worker at Strong-Scott Manufacturing Co. in Minneapolis, MN, welds the flange connection of a flat band iron ring with 10-gauge pipe. Strong-Scott was well known from the early 1900s until the 1960s for making milling and mixing equipment for the food, mineral and chemical industries. **ARC**

Have any vintage (pre-1975) photos you'd like to share? Email them in jpeg format to editor@arcmagazine.pub with a date the photo was taken (actual or approximate), a brief description (three or four sentences), and an email address where we can reach you for additional information.



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