Nuts and Bolts and Screws

Hi, hello, how are we? This is Gary Rogowski for Splinters. Thanks for joining me. Today's chat, a subject near and dear to my heart for many years. The subject is screws.

What? Screws?

I had this other idea that I'd been working on, but it wasn't coming together. So I thought, you know, it's time for some talk, some basic talk, some nuts and bolts talk, and screws.

Yeah, those things that hold together most of our world now. They're an important part of our technology, holding things together. My friends. Marty and Karen used to sell parts like that to the computer makers outside Seattle. Lots of little screws go into those things. And we use them in our woodworking.

And it was oh long ago, back in sixth grade that I was called upon, as were all my classmates, I was called upon to give a presentation to the group. And my presentation was on the screw. I've got a deep understanding of this little marvel. It is, as we all remember, one of the six classic basic machines.

The first, the most important, the one we use all the time in the shop is the mighty wedge. I argue and I'm happy to argue with you, just drop me a note. I argue it is every tool in our shop except a hammer. And that's held together with the wedge, usually. The wedges are chisels or plane irons, or saw blades, whether they be hand saws or circular saws of some sort, bandsaws, all wedge shaped. The sandpaper we use are just millions of little bits of wedge shaped particles cutting in a million directions. Files, rasps. It just keeps going on. Everywhere you turn, you go, "Oh, yeah, my jointer, my planer, those are wedge shaped knives." Yeah, wedges, separating fibers. So, the wedge, I think, is huge.

The inclined plane is the next basic machine. Looks to me like a wedge though, doesn't it? Doesn't it look like a wedge? The lever for lifting our machines up. I sold my jointer. I really am still mourning that. I sold my jointer to Brendan and Joe in their shop. Eastside Woodworks in Portland. Anyway, Joe said, "Oh, we're going to lift it. We got guys. We're strong. We're going to lift it." Nah, you couldn't lift that sucker. But lever it, you could. Lever it, we did. And got it onto a dolly and got it out of there. So that's our third. Our fourth is a pulley to run our various wedge shaped cutting tools. All our machines seem to have a pulley, unless they're direct drive, a few of those. The elegant wheel and axle, and finally, the screw is the last of the basic machines.

You know, when I gave my presentation to the group in my sixth grade class, I don't remember if I mentioned these other machines because, well, they were probably nodding off by this time. But I had drawn up the poster. I remember the poster. It was 20 times lifesize. It was, you know, 18 inches tall, two feet tall on poster board. There was a screw and I had drawn it out in all its glory. The head, the shank, and the threads. My classmates must have been on the edge of their seats, or not, to spy my magic marker work. That's how I remember it anyway. In any event, I regaled my classmates with the important information about screw head types: flathead, round head, and oval head. At the time, there weren't that many more options for screws.

Why an oval head? Because you can pair it with a cupped raised washer. It looks great with brass screws. But flatheads were the most common, and they sink neatly beneath the surface into a countersunk hole, which you can plug up, cap off. Or the countersink got drilled into something like a hinge, so the flathead set flat to the surface of that hinge. Round head screws were used, but mostly by the makers of the castle gates to keep out the barbarians. That's, I think, how we remember it.

Now, at that time, I don't think there were many drive types besides slotted and Phillips. And today, we've got Phillips and Square Drive and Torx head in a bewildering array of drive sizes. It drives me nuts. Oh, it's a 24. It's a T24. Oh, no, it's a T18. And I don't have the bit. Yeah, you get one with the box of screws, but they get lost. I love Phillips head screws. I use them all the time, and I want it to be known that Mr. Phillips was a hardware salesman in Portland, Oregon back in the '30s. And he got the idea from another fellow. I don't remember his name right offhand. So he didn't invent it, but he patented the screw and the screwdriver. And General Motors in their war and automobile efforts said, "Oh, this is a good screw because if you push too hard, you're not going to break the head. You're just going to spin out of there so we can speed up production." And Mr. Phillips was wise enough to license his products to other manufacturers, and I think he probably did pretty well.

Then we have Mr. Robertson, Canadian, hardheaded, who had the patent for his Robertson drive screw in 1911. And I thought they came out in the '80s. It blew my mind when I heard that in 1911. And actually, the square drive was patented in the U.S. back in 1875. That's crazy. So these things have been around a long time. But Mr. Robertson did not believe in licensing his square drive screw, so Ford Motors used them for a while, but didn't use them in their assembly lines in the States because they couldn't count on the supply. So they used them in Canada exclusively. I don't know if they completely disappeared, but I didn't see them when I first started woodworking, and it was only later on that square drive screws started showing up.

As far as elegance, it's arguable. I know some makers who will only use slotted screws, but, you know, they can be hard to drive, and you really need to shape a screwdriver tip to the slotted screw. And, you know, they go up in size with the numbers, unlike other numbering systems. So, a number one screw and number two screw are incredibly tiny. A number six and a number eight are pretty common in the woodworking and cabinet making trades. Tens and twelves and rarely 14s are big, big screws. But these screws with different head sizes had different slot sizes as well.

So you needed to, you really need to have a series of screwdrivers, have their tips ground so that they fit the heads very precisely, maybe a little bit of side to side play. This is particularly important in a brass head screw because brass is so much softer than steel and you can mar that head pretty easily. So that was one issue that I needed to alert my classmates to, those that remained alert.

The other was the importance of predrilling for the entrance of the screw. Now, a nail, you pound a nail in and it's exerting compression forces all the way around it. A round nail, you know, circumference of that nail, and pushing out. And, you know, it was pretty effective. One of my students, Kate, was doing a lot of research into, oh, preindustrial societies, woodworking stuff. And they had discovered I forget the seaman's chest that they had found in the waters of some bay, in the Baltic somewhere, I think. Kate wrote an article about this. There's an article in Mortise and Tenon magazine, I think, issue number five, called the Norse Sea Chest, about how it was built. Near as they could tell, it was made in the 1100s, AD. That's a long time. They opposed grain directions on this chest, but it was held together by nails, so the nails just kind of bent with the change in seasons. And then it was underwater for 800 years, 900 years. And so preserved as long as there was no oxygen to get into it.

Anyway, the screw is exerting its some compression force, but mostly it's those threads that are doing the job. And you need to predrill so that you don't split hardwood or particularly softwoods that are dried. Green softwoods will accept the screws just fine. But for a wood screw, the wood screw that I was lecturing my sixth grade classmates on was of a particular variety. I don't get it. As I think about this screw, I just don't understand it because it's got a head. All right, it's a flathead or a round head. It's slotted or Phillips head or square drive, whatever it is. But the wood screw then has a shank. And the

shank is bigger than the part below it, just by a little. And the part below it has the threads wrapping around a thinner shank. So you've got to drill twice. And I just don't get what that does for putting things together. I can see how sometimes if you're driving screws, you'll push one piece apart from the other, but that's fairly rare. And if you're doing one countersink hole, you know predrilling for the shank, that should be enough, not two.

Then all these screws were put in by hand. Oh my goodness. The twist factor was very apparent then. And it was a long, slow and laborious effort to get these screws in. I remember, I'm bringing up all these names, I remember Craig showed me the greatest invention ever. We were installing some job that he was doing. And it was a ratcheting screwdriver. And they're spring loaded. They come with kind of a reddish handle and they have an adjustment so you can use them just as a screwdriver or use them as a screwdriver and push on the ratchet and it collapses and the tip rotates clockwise or counterclockwise. You could do both.

Here's a brief aside, watch the movie Brazil. Robert De Niro has a cameo in this movie and he's some, I don't know, spy or something. And he has one of these in his hands and he loosens it and the whole thing expands. It's this cool little shot. It's a great movie. Crazy movie. Top three on my list. But I love seeing that ratcheting screwdriver as some sort of hightech device of destruction or something.

Anyway, once I finished this lecture, I forget now whether it was applause or did they carry me back on their shoulders? Most likely they tripped me way back to my seat. That's what sixth grade boys would do. Three Stooges were big back then. Prat fall, always good in class. But what has not left me is not only the lecture's accuracy. I think I nailed it. Ooh, sorry. And that choice that turned out later in my life to take up woodworking. But the other day, I thought to myself, "How much time have I spent putting in screws?" I was hanging doors on the new shop and going, "Yeah, here's my little drill-dex and here's my drill, and let's measure this." And, you know, it's been going on a long time.

And as I mentioned earlier, it's one of the inventions that is so ubiquitous in our life. You need a certain understanding of them, you know, rightee tightee for instance, when you're fixing a machine or putting in hinges. They're everywhere. Semi-permanent, but they can hold parts together. Better than a nail, I think, or a pin or a dowel. Now, the architectural historian, a guy named Witold Rybczynski wrote a book about them because of their ubiquity, because they were so commonplace, called 'One Good Turn'. Back at the turn of the century, he even wrote an essay about the most important invention of the 20th century, and he said it was a screw, but really, it came into place in the 19th century. And Archimedes was using the screw back in Greece, so Rybczynski was only off by 21 centuries or so. But its importance in manufacturing can't be overlooked. One can argue that theory of relativity was more important, but that's another episode.

One last thing I'd like to point out before I give you some tips about screws. I never use wood screws now. They're gone a long time ago. The double drilling thing makes no sense. Fully threaded screws are what I use now. They can be sheet metal screws. Trim head screws, which have a nice tiny diameter head. I use those a lot now and sheet-rock screws. But I use sheet-rock screws with the coarse thread, not a tight thread because it's just too close to, those tight thread ones are too close together. I don't think they do as good a job as the coarse thread, sheet-rock screws. There are so many varieties out thee. Find some you like. Make sure you predrill. Get the right driver for the head and you'll be golden.

Here are some tips though. Lubricate. Lubricate your screws with a paste wax or beeswax, soap, if you don't have anything else, or rub the threads on a candle. And this will help insertion. It just makes life easier. Think of it as having a spoonful of sugar to help the medicine go down. So just a little bit of wax. I bought a tube from Randy over at Carbide Saw, and I'm still working through it. It's just a very soft wax,

so easy to stick the screw in it and juice it up.

And here's an important tip. When you're putting in brass screws, get a steel screw that matches the brass threads. So the pitch, you know the frequency it wraps around the shank and the distance between the threads. Get one that matches in steel and drive that one first. You don't care whether it's slotted or Phillips or square drive, but you drive the steel screw first, cutting the threads, lubricated, of course, and then you drive in the brass one.

Why do I say this? Because it has been my experience. You only notice that the brass screw head is going to break off the millisecond before it happened. And knowing this now speaks to my experience. And I saw this great quote about experience once. 'My good choices are based on my experience. My experience is based on my bad choices.'

I mean, if you knew it was coming, if you feel it kind of loosening up, you'd go, "Oh, I better take this out carefully." But you don't. It's right before it breaks. That's when you know that you've pushed the brass to its limits. And then you got to take it out, which can be a, you know, it can be a laborious effort.

Okay, here are some tips on that. The easiest is if you can punch a slot into the shank of the brass screw so that you can get a screwdriver, a small tip screwdriver in it to twist it out. That's the easiest way rather than drilling it. They sell drills that are basically tubes that fit around the screw, but now you've got to fill a hole with a dowel or something so that you have threads to tap into or wood to tap into. And they sell left-handed drills. You can drill in and it helps remove the screw. But those are tricky. Brass is easy to drill into compared to steel. So when you break a steelheaded screw, that's work. So I try the slot trick first. That's the best for me. And so once you run the steel screw, then you can run your brass screw and life will be good.

Did I mention clocking the screw heads so they all point the same way? That's a topic for another podcast. One about craftsmanship.

Anyway, I want to thank you for listening. I want to remind you about the upcoming Setting Up Shop series this January. The first version was really successful. I did it every other Saturday, but this time I've decided to just run it on consecutive Saturdays, 12 Saturdays in a row. We'll start at 11:00 a.m. Pacific Time for 12 weeks straight, two hours of class with some recorded lectures and live chats and time for questions and answers. There's also office hours before class so that you're welcome to join me and ask me questions. So you'll have access to me just like I give to my mastery students. There will be videos of each class made available to students for a year's time so they can go back and review things. And in each class, each of the 12 classes, we do a small project or maybe the project stretches over a couple of classes. Something that's useful for the shop. Things like a bench hook or tool handles, tool rack, different items, push sticks that are really critical, I think, for your happiness in the shop and your sense of flow, a big topic for me, one that I really will discuss in greater depth. So that's starting in January, January 11th.

So please check out the website, northwestwoodworking.com for information on that. If you need tools and hardware and screws and screw extractors, machinery, check out Highland Woodworking. They are our partners in education. It's great working with them. So check out their website: https://Highlandwoodworking.com.

Thanks very much for listening. Take care of yourselves out there. It's a strange world. Get to the shop. Get into the shop. Adios. This has been Gary Rogowski for Splinters. Take care.