There's money in magnetos

Editor's note: Once again we tip our hats to Hank Henke for his service to the industry. During the recent ERA Show he made a presentation on the lost art of magneto rebuilding. The response to his presentation was overwhelmingly positive and we are pleased to print a transcript of the session in this issue of the *Exchange*.

My name is Henry Henke. I have United Starter & Alternator in Indiana and have been in the business for about 30 years. I started my career as a mechanic when I was 15 years old. The man I went to work for got tired of me asking questions. The first job I had was scrubbing parts with a bucket of gasoline and kerosene, and I'd scrub them and I'd say, "What's this?" "Where does this go?" "What does this do?" His comment was, "Do you ever run out of questions?"

I won't promise you I've got all the answers, but we have a gentleman over here, John Brillman from The Brillman Company. They are a supplier of magneto parts. If I can't answer your questions I'm sure he can (brillman.com, [888] 274-5562). Good guy to know. The other one that sells magneto parts is Standard Magneto in Chicago, Ill. They are probably the largest supplier of magneto parts in the country. Their website is standard-magneto.com and phone number is (800) 624-6386. Their whole catalog is online.

A very knowledgeable man by the name of Rich at Standard Magneto is the man that I talk to when I have a problem. He can tell you before you even stick your fingers in a magneto, "Don't mess with that one because there's no parts, you're not going to find any parts. If you break a screw you're going to own that magneto." Or he's going to tell you, "Yeah, I've got all the parts for it and do what you've got to do."

There's money to be made in doing magnetos. It's not a big dark secret about how they work or anything else. It's pretty straightforward. What I do on pricing them when I rebuild them is get the price of a rebuilt or a new magneto. I figure out I could buy this magneto for a $250 and if I'm going to sell it to somebody I'm going to mark it up 40 percent. So that's my target figure.

Now take the magneto apart, and see that I only have $50 worth of parts. It gives me a lot of leeway because I'm going to sell it for what I would sell the rebuild unit for if I bought it outright. Why should I sell it for anything less? And that money goes in my pocket. I am not embarrassed to charge for what I do. This is not a hard thing for me. You do not need a lot of special equipment. You will need a small press; hand impact driver; quarter-inch socket set or nut driver set; screw driver; small puller; light hammer; a feeler gauge and a five-eights-inch socket to remove the impulse retaining nut. With these tools you will be able to disassemble the magneto. Some magnetos have gear drive. All of them have to have some kind of pulse. Take the gear off, they're all pretty much the same.

So how do you test them? I had a plug made that I'll pass around. This plug allows me to spin the magneto on my lathe. I made a bracket for my lathes, to bolt the magneto on. Now that's two special parts. The third special tool is a spark plug rack so I can make sure all cylinders fire. I have the spark plugs set at .060—twice the gap it normally is. I talked to John the other day, and he said you really want to go a quarter inch. So I will redo my settings next time I run one.

OK, we have taken the gear off the front; the next thing is you've got to impulse. This impulse is on a tapered shaft in most cases. Do not try to pry it off with screwdrivers because you're not going to get it off. You know how difficult it is to get the tapered pulley apart—same thing here. That's why you need a little puller. All you have to do is put just a little pressure on the impulse and tap on the puller lead screw with a hammer and it'll pop right off. Underneath there is usually a little woodruff key; you've got to get that out of the way.

Now what are we going to do? On a Fairbanks-Morse you have a metal washer, a rubber seal, and another metal washer. You have to remove these pieces to access the wire retaining ring. This wire serves two purposes; it holds the bearing in the housing and the shaft to the bearing. Failure to remove the wire clip will lead to a broken housing. Now we need to work on the other side or the magneto. You see the breaker plate which also has the rotor shaft on it. I'm going to pass around these two gears. See if you can find the timing marks.

Before you start taking things apart, there are tiny timing marks you want to make sure that you locate. The small gear has a tooth ground at an angle and the bigger gear doesn't happen to have any marks on it. So that one is a good example of why you have to mark it some way so you know you're going to get that gear back in the same relationship when you put it back.

Magnetos defined

According to "Bosch Automotive: A product history," a magneto is an ignition device for internal-combustion engines. Bosch built its first magneto device—for stationary engines—in 1887. It was tested in vehicles from 1897. Series production ran from 1898. Magneto ignition is based on the principle of a double-T armature—around which a wire coil is wound—moving in a magnetic field to generate a current.

The movement is dependent on the rotational speed of the engine. This allows an ignition current to be generated to ignite the air-fuel mixture in the cylinder at the right time (depending on engine speed). Low-voltage magneto ignition (also called ignition with break-spark rodding or touch-spark ignition), the more common approach to ignition up until 1910, produced the spark by suddenly separating two contacts within a closed circuit.

In the case of high-voltage magneto ignition systems (also known as electric arc magneto ignition systems), developed in 1902, the vital spark was produced by the arc of a current, i.e. by a luminous electrical discharge between the electrodes of a spark plug within the combustion chamber.

High-voltage magneto ignition systems carried the day because the break-spark rodding in low-voltage magneto ignition required a great deal of maintenance and repair work, leading to complaints. It was also very difficult to install.

Next we have a coil which looks a little different than the coil that you had on your car, but it's no different. What does a coil do? It increases the voltage. To get that coil out, you've got two screws here. If you have time, set this up someplace—in a vise or whatever—and fill those holes

up with penetrating oil and leave it sit overnight. They can sometimes be a real booger to get out. I use an impact driver to take them out. Do me a favor, when you put these back in do not put Loctite on them. They don't have to be that tight. They're not going to come loose—the screw's about one and quarter-inch long and it's all threaded. Screw them back down, snug it up and it's not going to go anywhere. You're not holding anything except the coil in there to begin with, so don't put Loctite on it. The little screws are the points in the condenser and the like. Throw the Loctite tube away. You don't need that stuff when you're doing this.

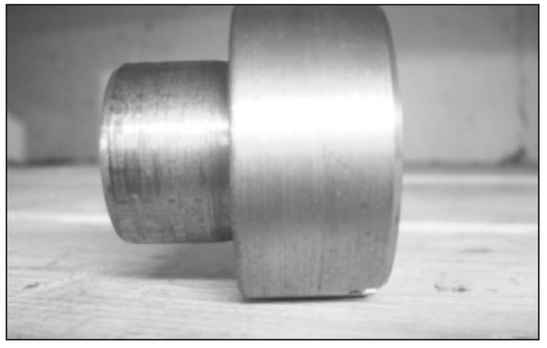
So we've removed the breaker plate and now we can press the rotor out. Now that I have the rotor out, I'm down to where I can get the bearing out. See that ring in here? It's a stop for the bearing. Take the bearing out from the rotor side after removing the snap ring, now like any bare case. I wash the tank, clean it up, sandblast it so it looks like brand new. Now John can correct me if I'm wrong, but I have never run into one where I had to have the magnets re-magnetized. If I do, I know that Standard Magneto will do it for me.

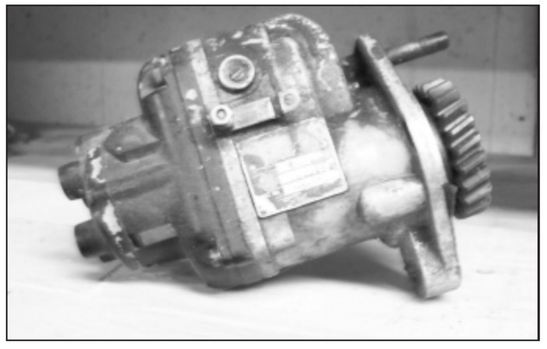
I've got two surfaces here that are not magnets in the case, and two that are on the rotor, one north and one south. What happens when you pass one magnetic field over another? You produce current. Current charges the coil. When does the spark occur? When the points are closed or open? As they open, spark occurs because it collapses the field upon itself and makes a spark.

It's pretty easy to take a magneto apart and easy to put one together. When you get all the parts back together and you're setting the contacts, treat them gently. You want .015 clearance on your point. Tighten the screw down, check it—oh that's too tight. Loosen it up, make adjustment, and try it again, now it's too loose. Get it just right. You may have to do it three or four times. But it's important to get that gap right. Most magnetos have some kind of a wiper that goes against the rotor shaft. It's an oiled wick. If you don't have that wiper, you can put a little grease down in this groove behind the rub block. Just a little, not much, you don't want a lot of grease on there. As the block wears, it lubricates.

Now how many of you guys ever tuned up a car and you bought points from NAPA years ago? What was in every box of points? Little tube of grease, right? I had a guy tell me one day I don't know why they put that in there but I take it every day. But that's what that was for—to put on this rub block. Pay attention to where all the wires go and how they're routed. If you put this thing all together right, and pay attention to what you do, it's going to work. You forget a little insulator here, this is what shuts it off. How do you shut the magneto off? You ground it, right? So if that's grounded it's not going to work. If somebody's been in there and has run the wires the wrong way, and the insulation's rubbed off it, then it's not going to work.

Now, I'm just trying to remember all the things that I had problems with when I started messing with these. Standard dust cover is the distributor cap. When you get it from your supplier, whether it's John's or Standard Magneto, this little carbon brush isn't in there. You have to put that in. If you work over a rag when you drop it you





don't have to chase that little spring, you know where it went, because that spring is not much bigger than the hair on your head. And it's tapered—bigger at the bottom than it is at the top, so sometimes it can be difficult, believe me—as your fingers get older it gets more difficult to get that spring in. Something to watch for is if you replace the cap, take the coil pickup out of the old one. It unscrews. These come in different lengths.

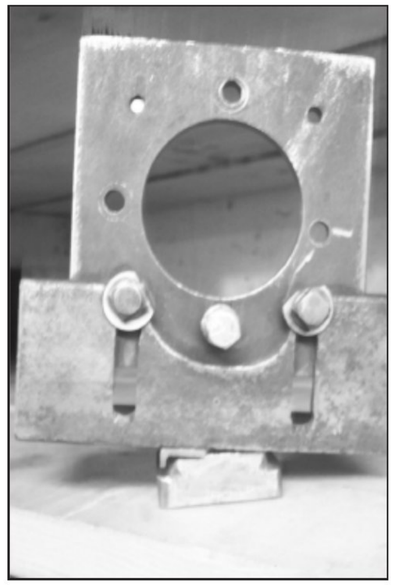
John, do you have kits for gasket kits made up? OK. I always buy a gasket kit with seals and everything in it. Be sure you put all the seals and all the gaskets in. Very seldom have I had to replace one of these (end cap). Usually it's only because somebody dropped it and broke it, or somebody over-tightened a screw and broke the corner out of it. I replace the end cap cover every time I do a magneto. Don't even look at it, I just replace it. A hairline crack in this Bakelite someplace, makes a difference whether it's going to work or not. Don't throw these parts around because they're very delicate and they'll break. It's not like a 40MT or 50MT where you just store the stuff here and there. You've got to be very careful.

The little rotor—I replace this every time too. Between the coil, the cap, that's what makes it work. If the rotor's worn out it won't conduct current. If it's worn away, it burns itself away every time it makes an arc, it burns a little bit. Pretty soon you've got a problem with voltage. So I make a practice to put in a new rotor, a new cap, points, condenser in every one of these. And as I say, depending on which cap you get, that cap is going to cost you $35 to $40. Now, when it comes to pricing, I don't care how much I spent to do it. I believe in charging what the market will pay. So when a guy goes to John Deere to get a John Deere magneto and they tell him it's $500 and you say well my price is $450—if you've already figured it out like I've told you, you're going to get the job. John Deere's not ashamed of charging $500 for this magneto, why should you be?

Here's one word of caution. There are some units out there that your customer is going to call and say, "Hey, I've got a magneto that I need to get rebuilt." And he's got to bring it in to you. And I'll pass this case around to you and you can look at it; it's a pretty heavy case. And you're going to use that unit and all the assembly, it's not going to weigh anywhere close to this. What do you suppose that is? That's a distributor, not a magneto.

Now I did one for a local White dealer about a year and a half ago. He called me up and said, "Hey, I've got a magneto." I





went out and picked it up, went through it, figured he knew it wasn't a magneto, he knew it was a distributor. He called me a couple of days later and says, "Hey, I can't get this magneto to work." I said, "What do you mean, magneto? That's not a magneto, it's a distributor. It's got a hot wire going to it." He told me no, it's a magneto, I don't need a hot wire. I told him that's not a magneto, it's a distributor. Now here's a guy that has grown up working on farm equipment and he didn't know the difference.

Now Standard Magneto has two books available. You have to buy them, but they're really good books. I don't remember what I paid for them, but the information that's in there is invaluable. And if you get the magneto number you can look all the parts up yourself and see what's there. But don't be afraid to work on them. And use the supplier's parts. This is a case where the supplier of the parts can tell you, OK, what you do is this and this and OK, back up then when you get this, then you should have done this and put it together. And they are more than willing to help you, because there are very few magneto builders out there.

Standard Magneto is the largest supplier of parts. They make a lot of the parts themselves. I had a magneto off of a 1920-something steam engine—what they call an oil engine—and I called and said a guy wants this rebuilt, what kind of parts are available? There are none. Just don't touch it—give it back to him. Wrap it up, don't touch it, and don't drop it. There's nothing there. I don't know what the guy did with it, but it was a spare he had and I don't know what he ever did with it. As I said they are more than willing to help you.

When you're taking a magneto in, find out what the application is, all the information you get, as much as you can get. I talked to Rich at Standard Magneto the other day and he says tell them all to go to my website, they're welcome to call me. He will give you a good discount on the parts. John says he'll give us a good discount on the parts. Take advantage of the guys' knowledge because they're willing to share. And there's good money to be made.

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