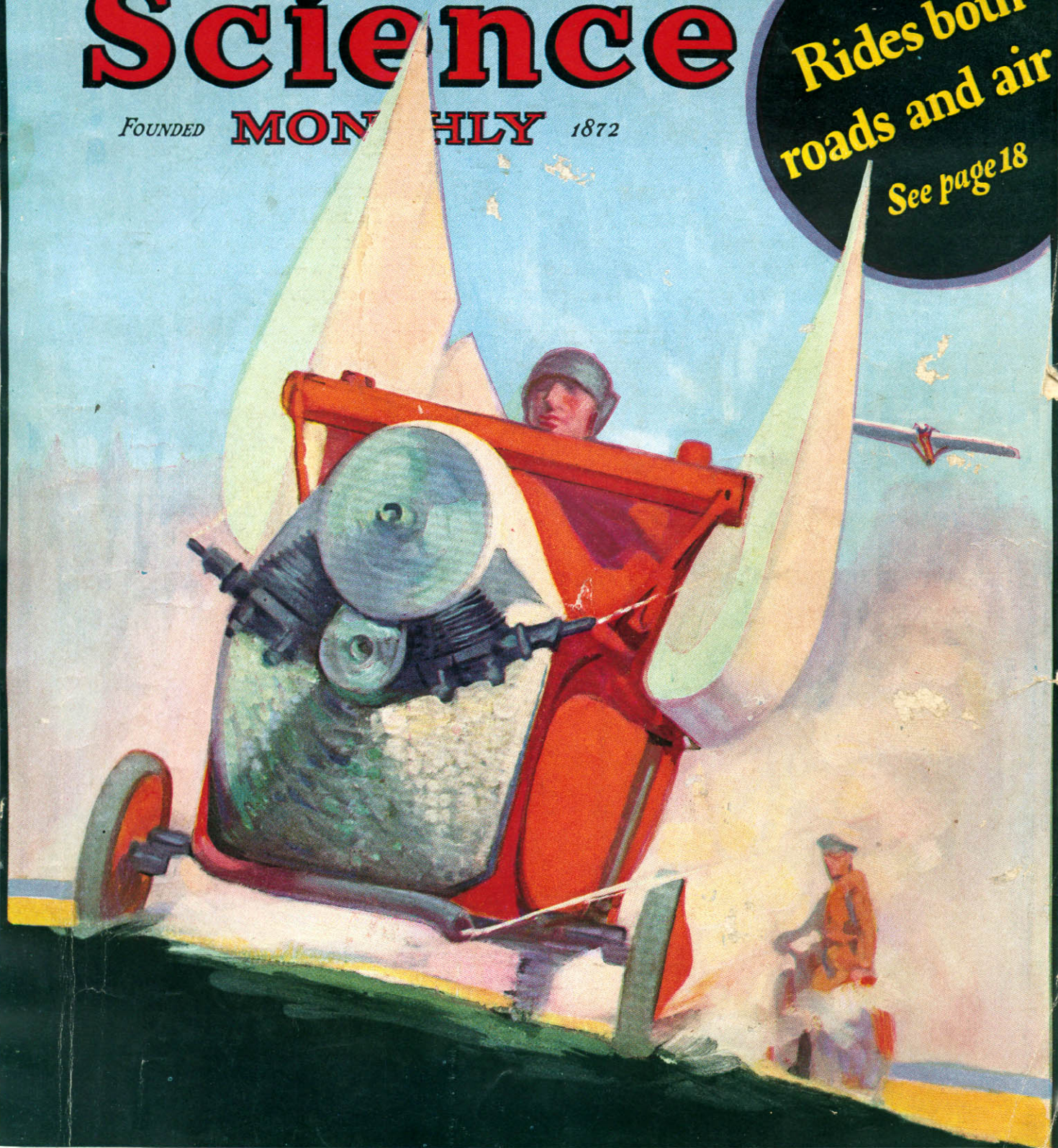


# Popular Science

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# When Your Ignition Goes Bad

*Gus Explains Why Spark Plugs Foul, and Why It Pays to Carry a Spare Condenser in Your Car* By MARTIN BUNN

"HERE is the most remarkable spark plug in the world!" asserted the salesman, as he swung his sample case up on the corner of Joe Clark's desk and opened the cover with a flourish. "Can't foul—gives the hot-test kind of a spark—never breaks down—lasts forever—and you can sell it at a good profit." He shoved a couple of shiny plugs into Joe's hand.

"They look good," observed Joe, as he examined them. "Are they guaranteed not to foul?"

"Absolutely!" stated the salesman with much emphasis. "They're positively self-cleaning. See the peculiar shape of the recess back of the points? That shoots the exploding gas across the points and sweeps away any and all carbon."

Ordinarily, Joe consulted with Gus Wilson, his partner in the Model Garage, about any additions to their mechanical stock, but as Gus was out and so was the stock of spark plugs, he decided to take a chance.

"All right," he said after his inspection was completed. "I'll take two dozen."

A HALF hour later, Gus drove into the garage with the car he had gone out to test. The engine was missing badly, and blue smoke puffed out of the exhaust in great clouds.

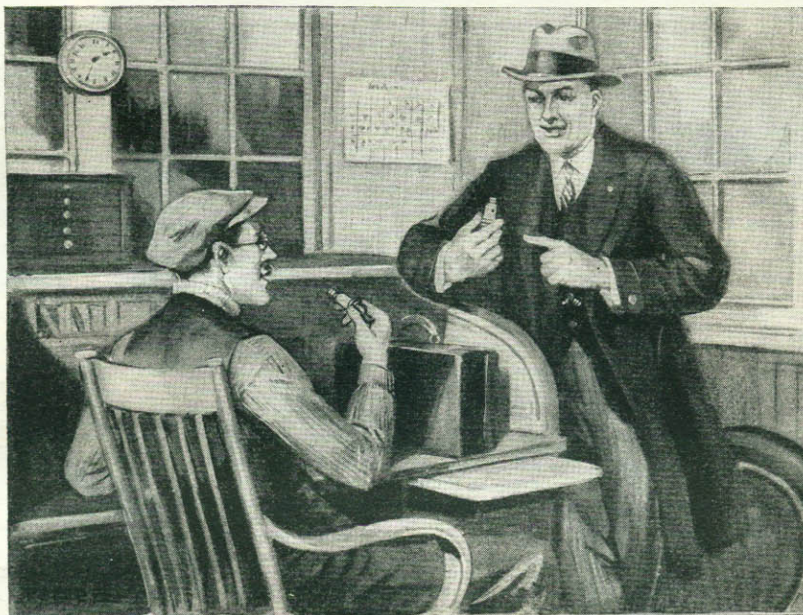
"Hey, Joe! Bring out a handful of spark plugs!" he sang out, as he snapped off the ignition, and the engine died with a final spurt of smoke that rolled slowly across the floor in the form of a huge ring.

"Here you are," said Joe, as he popped out of his little office with some of the new spark plugs in his hand. "These will cure the trouble. I just bought 'em, and the salesman guaranteed them not to foul."

"Guaranteed 'em, did he?" Gus growled. "Well, here's where you have a chance to collect, I'll bet. This motor is a regular oil gusher."

As soon as Gus had the new plugs screwed up tight, he started the motor and it proceeded to run perfectly without a skip.

"They're the real thing all right, aren't they?" exclaimed Joe, with a satisfied smile.



The salesman told Joe that his "self-cleaning" spark plugs were guaranteed not to foul, —an extravagant claim which Gus soon proved to be "bunk" when he placed them in an engine in which the cylinder rings were passing oil and found they fouled like others

"Humph!" Gus grunted as though he had not heard. "That proves it's not valves sticking. It was running so rotten, I thought maybe the valves were on the blink. The trouble is the piston rings are passing oil, all right. Just wait a minute and watch what happens to your wonderful guaranteed plugs."

The partners stood there watching, as the motor continued to purr smoothly. Even the smoking became less and Joe's satisfied grin broadened. Then suddenly the motor skipped an explosion. The skip became more frequent and at last two cylinders cut out completely, so Gus snapped off the ignition.

"Now try to get your money back from that salesman!" said Gus, as he



Morrison thought condensers were only for radio sets until Gus took him to his test bench and showed him how a broken-down condenser caused his auto engine to stall

shoved the two badly fouled plugs into Joe's hand. "Don't let any high pressure hot air artist tell you there is such a thing as a real non-fouling plug. There ain't no such animal. So long as the piston rings are letting too much oil get by, and the heat of the explosions is cooking the extra oil into tarry soot and baking it into hard carbon, you can bet your last dollar that any plug in the world is going to lay down and quit on the job. Any good plug is a non-fouling plug if it's screwed into a cylinder that is performing properly.

"All that stuff about special chambers that shoot the soot off the points is pure bunk, because the soot that gets on the points is not what puts the plug on the bum. It's the coating of carbon that forms on the insulator around the center point."

Joe's face registered extreme disgust, as he retreated to his office without saying a word.

GUS started to work on the car again, but he had only succeeded in arranging the tool kit to his satisfaction when the roar of a motor sounded outside the door, followed by a vigorous thumping that rattled that sturdy piece of woodwork on its hinges.

Gus flung the door open and found old man Morrison with his foot swung back, just ready to deliver another hearty kick. Morrison, who was reputed to have a purse as long as his temper was obviously short, dropped his foot to the ground and turned to shut off the ignition of his five-thousand-dollar gas buggy.

"The gosh-hanged, dad-blamed, confounded piece of junk!" he snorted apoplectically. "The blankety-blank thing stopped every time I let it slow down, and twice I had to get out and crank it to make it go again. Look her over and see what in blazes is the matter!"

"You say you had to crank it a couple of times, Mr. Morrison?"

"That's what I said!" Morrison answered testily. "And once was right in the middle of Main Street—the traffic was all balled up before I got it started."

(Continued on page 156)

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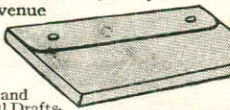
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When Ignition Goes Bad

(Continued from page 66)

"Well—let's see," Gus began thinking out loud, as he raised the hood. "Can't be a dead battery because you would never have got it started again once it stopped on you. And it couldn't be dirt in the carburetor because that wouldn't have prevented you from starting with the starter. I wonder what the contact points look like?" he went on, as he snapped the spring hooks off the distributor head and lifted it up.

"Look here, Mr. Morrison," he said. "Here's the clue to the trouble. These points are badly burned. Much more so than they should be from almost any amount of use when everything is all right. I'll bet we find the trouble in the condenser."

"Condenser!" echoed Morrison sneeringly. "Say! What are you trying to put over on me? I wasn't born yesterday. Condensers are those funny things with a lot of plates that move in and out when you turn the dials of a radio set. They don't belong in automobiles."

"THAT kind don't," said Gus, "but there is a condenser in every auto on the road today. Here is yours. It's just a number of layers of tinfoil separated by waxed paper. It is connected across the contact points in the timer; when they are pushed apart by the little cam there, the juice runs into the condenser instead of making a spark across the points."

Gus proceeded to remove the coil, and then he took the two parts to a corner of the workbench where he had a battery fitted with snap terminals, a switch made out of breaker contacts, and a pair of wires sticking up in the air about 3/8 of an inch apart. He connected everything up so that when he pressed the contact points together and released them, the spark from the coil should have jumped across between the two upper wires.

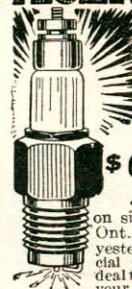
"Watch, now," directed Gus, as he placed his thumb on the contacts and closed and opened them several times.

"SEEMS all right to me," exclaimed Morrison, as a feeble spark jumped across the gap at the third break of the contact points. "What do you expect—a regular flame?"

"Sure it sparks some!" growled Gus. "It's a darn skinny spark, though, and if you will keep your eye on the contacts here, you will notice that there is a fine, healthy spark between them every time I let go so they can separate. There oughtn't to be hardly any spark at the contacts, and the only reason there is, is because the condenser is on the bum. You know a spark coil makes a spark at the plug because of the sudden stopping of the current flowing through the primary coil by way of the contacts, and if the condenser allows a sort of a miniature arc to take place at the contacts, it lets the current slow down gradually, and you get poor ignition. It worked when you cranked it because the battery voltage was higher when you kept your foot off the self-starter."

(Continued on page 157)

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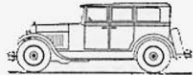
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## When Ignition Goes Bad

(Continued from page 156)

"All right, put in a new one," snapped Morrison. "I'll take your word for it, so don't let's waste any more time palavering about it. I'm in a hurry!"

Joe, who had been listening, ducked into the stock room and reappeared with the proper instrument. Gus fitted it in place, and Morrison, after paying the bill, stepped on the starter and drove out without even a "thank you" to Gus.

"What's the use of being nice to a guy like that?" exclaimed Joe. "All that fine talk about coils and condensers went in one ear and out the other. I'll bet the next time the condenser lets go, he will be stuck again without knowing what the trouble is."

"Never mind," replied Gus. "The old grouch will be around for a complete overhaul job pretty soon if he doesn't take better care of that bus. It's getting awful noisy already."

"BY THE way, Gus," said Joe, "I knew most of that dope you gave him about condensers, but isn't there some way you can tell when a condenser is getting too old and should be replaced?"

"Not that I know of," Gus answered thoughtfully. "That's one of the funny things about condensers. One might last for twenty years, or it might break down completely the day after it was put on the car. Morrison was lucky. His condenser only partly broke down. Most times when a condenser lets go at all it goes dead completely. You may be running along with everything working as fine as silk and then, without any warning, the motor just stops, and, if you haven't a spare condenser in the tool kit, the nearest garage is going to make some money towing your car in."

"Yet lots of fellows think they are prepared for anything in the way of ignition trouble if they have a couple of spare spark plugs tucked away somewhere, and the funny part of it is that you almost never have more than one spark plug go bad at a time, and you can always limp to the next garage on the remaining cylinders."

"ANY time I am going on a long trip," continued Gus, "you can be sure there is a spare condenser in the tool kit as well as a couple of spark plugs and a spare coil, besides a new breaker arm spring and contact points. I never got stuck yet so I couldn't get home."

"Well, condensers are one thing I don't have to worry about on my car, anyway," laughed Joe. "It hasn't got any!"

"Where do you get that stuff?" snorted Gus. "Your confounded puddle jumper has four of them—one in each of the spark coils. But I noticed a spare spark coil in your tool kit and that will take care of coil trouble and bring you home even if you are too dumb to know how it happened."

"Now suppose you put the rest of those guaranteed spark plugs in your tool kit—you ought to be able to get home from most anywheres with all those fine plugs to pick from!" Gus concluded sarcastically.

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