

JANUARY 1966 35 CENTS

Popular Science

MONTHLY

JAMES BOND'S Weird World of Inventions in "Thunderball" —HOW THEY WORK!



JET-PACK
FLYING SUIT

ROCKET-FIRING
MOTORCYCLE

SEAN CONNERY AS 007
WITH GEIGER-COUNTER WATCH
AND UNDERWATER CAMERA

MINI-SUB AND MANNED SEA TOW

Berna

IS FRONT-WHEEL DRIVE FOR YOU?

PS editor drives Tornado 1000

FOR WINTER DRIVING:

- Choosing the Right Motor Oil
- More Life from Your Battery



by Mackinnay Kantor

RS
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An engine exploded into action in the alley. Gus flattened himself against the wall of the garage.

Gus Meets the

By MARTIN BUNN

Headlights blazed against the glass of the Model Garage door. Gus Wilson, staying late to tidy up some paperwork, hoped the car owner had pulled in only to make a phone call from the outside booth.

The brief wail of a siren told him otherwise. He went to the door and opened it. Into the shop swept a big Chevy. Police Chief Sam Eldon got out of the car.

"I know it's after hours, Gus. But I need your help right now," said Eldon.

"Sure. You've got it. What's wrong?"

"This car's been losing power for weeks. Our police mechanic tuned it, timed it, put in a new coil and new plugs. Each time he works on it, it runs better for a while, but then it starts to fall off again.

"Three weeks ago I made him put in the new plugs, though he swore it didn't need 'em. They made a big difference. I thought I had it licked—until tonight when I lost a hot car at a crummy 70 per. Just could have been the Friday-night bandit," the Chief concluded morosely.

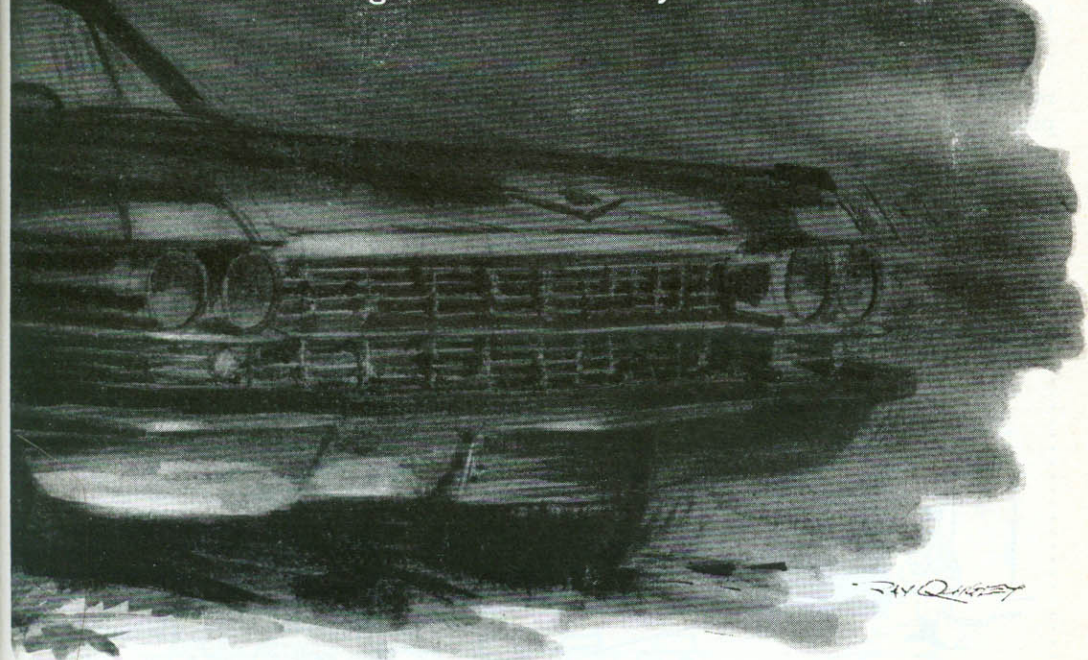
"What channel's he on?" quipped Gus.

"I'm not kidding!" snapped Eldon. "Don't you read the papers? He's been sticking up gas stations, liquor stores, delicatessens—and always on Friday nights."

Gus swung the hood up, hooked a tachometer and timing light to the engine, and started it. The spark was right on time, and advanced by the book as the engine was revved up. Disconnecting the light, Gus attached his spark-plug checker. All eight traces on its tube face were normal.

"Why check plugs?" demanded Eldon. "I told you they're almost new, didn't I?"

A dangerous customer pays a visit to the Model Garage, heists the day's receipts—and leaves a strange clue to his identity



Friday-Night Bandit

"Sure. But this gadget also tells me that the new coil is connected right and the high-voltage polarity is correct. Now it's going to tell me something more."

Gus pulled off one of the spark-plug cables. The corresponding trace leaped up, but fell short of the top of the screen.

"Hurry it up, will you, Gus? That character hits any time between dark and dawn. I've got to be mobile."

"Spark voltage is low," declared Gus, killing the engine. "Let me check a bit."

He made certain the terminal nuts were tight on the coil, distributor, and switch, and the wires firmly crimped in their lugs. Hooking an ohmmeter across the coil and distributor terminals, he flexed the wire between these inch by inch. The needle held steady near the zero-resistance mark. He made the same test from the other coil terminal to the ballast resistor.

"The car runs; those wires and connections must be okay," Eldon grumbled.

"An internal break could leave just a strand or two carrying current, but not enough to saturate the coil at high speeds, when the points close only for milliseconds," said Gus. "An intermittent break might not show on the plug check I made. But these primary connections seem okay."

The Chief grunted. Gus hooked the ohmmeter across two terminals on a small rectangular object on the firewall. Taking a reading, he went into the parts cubby, and came out with a duplicate of the object he'd been testing.

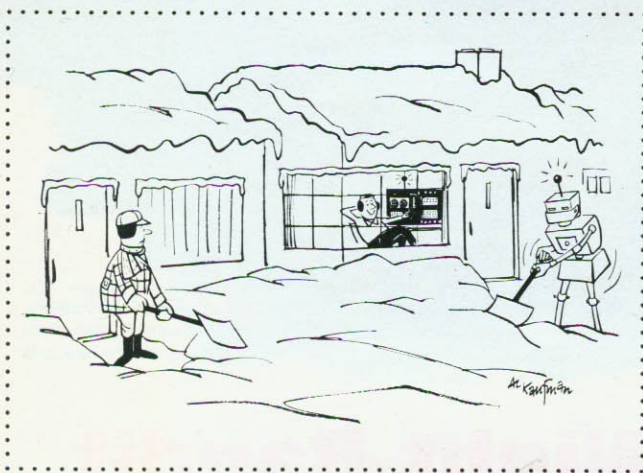
"It's your ballast resistor, Sam," he explained. "The thing that's switched into the primary circuit, after the engine starts, to cut down current so the points last. Re-

Continued

sisters don't often give trouble. Once in a while their coils short to the housing, giving plenty of notice by smell and smoke, or they break and open the ignition circuit. Or, if there are two resistance coils and one breaks, the resistance doubles and lowers your sparking voltage.

"Your trouble was the sneaky kind. The resistor changed its value. Whether from pitting, corrosion, or whatever, it happens, and the resistance always goes up, not down. The coil gets less voltage, puts out reduced high voltage, and the spark doesn't fire under high compression."

Eldon shook his head. "If it's that gad-



get, how come performance picked up when we adjusted points or put in a new coil?"

"If the points are out, resetting them will pick up performance a bit. The new coil may have been more efficient, doing the same," explained Gus. "New plugs fire at lower voltage than old ones, so they camouflaged the trouble for a while. But as they got older or the resistor's value climbed still more, the symptoms came back."

"Okay. Put that doohickey in quick."

Gus installed the resistor. With the engine running, the trace of the disconnected plug now rose to the top of the screen. Disconnecting the instrument, Gus pushed the free cable back on. The Chief roared out almost before Gus could drop the hood.

Busy with figures, Gus thought he heard a car roll down the alley behind the shop, but went on filling out a bank slip for night

deposit, and forgot the vague sound.

A hammering on the shop door jolted him. He swept the cash into a drawer and got up. The face outside, seen through the glass panel, was shadowed and almost featureless between a turned-up coat collar and a battered hat brim.

"Gotta have help!" the man yelled, a note of desperation in his voice. "Car's quit and my wife and kid are out there freezing in it. It's only half a block."

"Wait a minute," shouted Gus. He went back for his jacket, gloves, flashlight, and tool kit. When he unlocked the door, something hard jabbed into his side.

"Get back inside. Move it!" barked the man. "This is a stickup."

Gus backed into the shop. The stranger followed, slamming the door. He wore a Halloween mask that hid his whole face.

"Put the toolbox down. And don't get smart." The shop's night light gleamed on a nickel-plated gun.

"You'd be smart to scam," replied Gus. "I'm working on the police chief's car. He's road-testing it, but he'll be back."

The masked man tittered nervously. "I saw him. The way his crate took off, he won't be back. So let's have the dough in that drawer."

The gun gestured. Inwardly furious, Gus walked ahead to the office.

"Back up against that wall. Don't try anything," warned the man with a high-pitched giggle. "Guns make me nervous."

Helplessly Gus watched him take out the bundle of bills and pocket it. Then a gloved hand ripped out the phone cord.

"Now go back to the door," rasped the shrill voice. "Easy, and nobody's hurt."

Again Gus preceded the man, opened the service door, and stood aside. Still holding the gun on Gus, the slim man stepped through, looked about, and vanished.

Half expecting to be met with a bullet, Gus stepped out, too. An engine exploded into action in the alley. Gus flattened himself against the front of the Model Garage.

It was a noisy engine. A *clank-clank-clank*, magnified between the alley walls, accelerated to a rattle as the car leaped out of the darkness. It passed close to Gus,

a big, dark-colored sedan without lights, but he had no time to spot any details that might identify the make.

The car raced off, tires squealing at the corner. Gus headed for the outdoor phone.

Its handset, torn off the cord, lay on the floor. Locking the shop, Gus got into his car and took off for the police station.

Monday dawned clear and cold. Poorer by \$380 for two engine overhauls and several smaller jobs on Saturday, Gus tried for the hundredth time to remember some detail he hadn't told Eldon about the holdup. The phone broke in on his reverie.

"I'll be right there, Mrs. Starke," promised Gus when the voice paused briefly.

Glad to have something to do, he made sure there was a good battery aboard his tow truck, and drove to the Sunrise Supermarket. Mrs. Starke's compact, immobilized by a defunct battery, was brought back to life with a rental battery. As Gus was packing up his tools, another engine fired up nearby in the huge parking lot.

Its *clank-clank* was familiar.

The car was a '63 Cadillac in the next bay. As it moved out, the license plate came into view, but it was so mud-smeared as to be unreadable. Gus got into the tow truck in a hurry, and followed the car.

A woman was driving at an easy-to-trail speed. Ten minutes later she pulled up in the driveway of a modest ranch house.

"**Not bad sleuthing, Gus,**" admitted Eldon a couple of hours later. "But you must be wrong about that noise. The car belongs to a Harry Stoner, shop manager at the Hargrave plant. He has a good reputation and he was working with half a dozen other men when you were held up. In fact, he works the night shift every Friday night."

"Find out who's borrowing his car, then,"

urged Gus. "I was almost sure from the first that the noise in the alley was from a Caddy. Now I know it was. That one."

"Okay," said Eldon. "I'll check it."

When the Chief's car arrived outside the Model Garage for the second time, a squat bear of a man followed him inside.

"Gus, meet Harry Stoner. You were so sure of yourself that I asked him what men at Hargraves got high-pitched or giggly when excited. He gave me two names.

"One of those fellows told me calmly where he was last Friday night. The other went green and tried to make a break. We collared him. His key chain had an extra key—for the Caddy. Stoner left the keys in it one night, so this character made himself a duplicate and set out to do a little armed moonlighting, thinking that if the car were spotted it couldn't be traced to him. We found a lot of money in his room. Could you say how many of what bills you lost?"

"Four fifties, 11 tens, 14 fives," returned Gus crisply. "With two red rubber bands around the bundle."

"Uh-huh, we found it. You'll get it back, Gus, and much obliged for the assist."

"Look," said Stoner. "The Chief said you knew that noise came from a Caddy. So for the love of Pete, what makes it?"

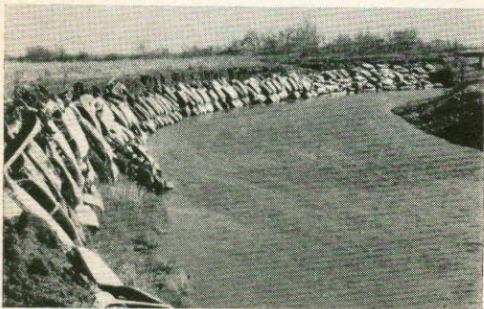
Gus laughed. "Nothing fatal. It's the water-pump bearing. I know," Gus went on as Stoner opened his mouth. "It doesn't even leak—yet. But on Caddies up to '63, that bearing is small for its job, and when it wears you get that slam-clank, with nothing to show what's causing it."

Stoner sighed. "It nearly drove me nuts. You've done me a real favor. Thanks."

"You're welcome. I owed you one."

"You did? What have I done for you?"

"Put up with that noise in your car long enough," returned Gus with a grin, "to save me a fistful of dough." P E



Old car bodies help prevent erosion

Another new use has now been found for old automobiles: Their bodies, no longer fit for the road and ready for the dump heap, are substituting for stones to hold back the banks of the Elkhorn River where it flows near Norfolk, Nebr., north of Omaha. They prevent erosion and possible blocking of the stream. City officials are well pleased with the results.