

AUGUST 1967 35 CENTS

Popular Science

MONTHLY

**ELEGANT PICKUPS:
Your Next Family Car?**

**The Go-Go Engines That
Power MOTORCYCLES**

**A Great New Sportscraft You Can Build—
THE AQUA GLIDER**



**How to Build a Boat
News About the '68 CARS!**

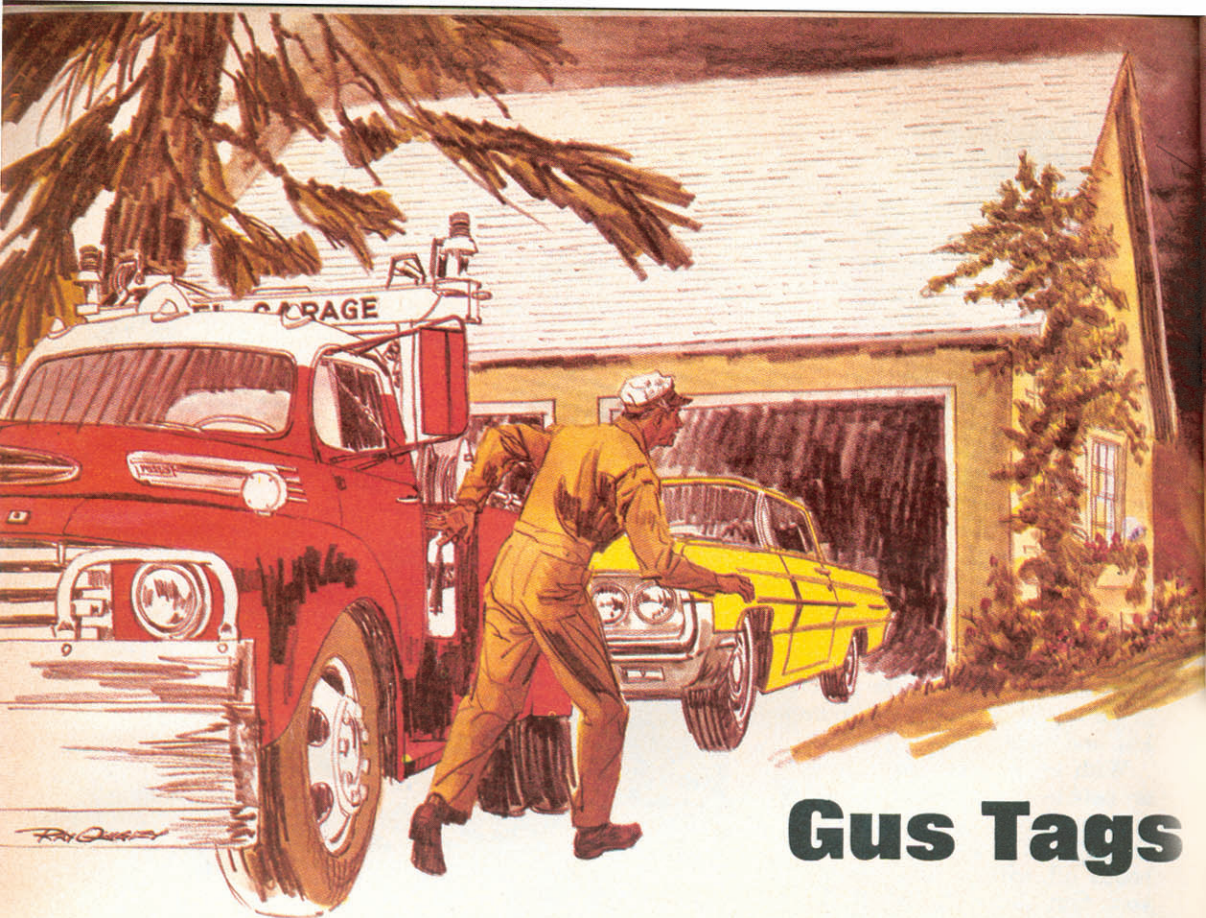
**Television
The Science
You've Never Knew About Beer**

Build a Coffee-Table Music Center

**Can You Build
and JOHN WAYNE'S Fabulous Yacht**

By WERNHER von BRAUN

HOW WE'LL LAND ON THE MOON



Gus Tags

By MARTIN BUNN

The voice on the phone was that of Silas Barnstable, town grouch, tightwad, and Gus's most trying customer.

"Remember them new plugs you sold me, Gus? I had bad luck puttin' them in. Dropped a terminal nut off one in the plug hole."

"Haven't run the engine, have you?"

"Course not. Tried a magnet on another nut. It didn't hold, so I can't fish that one out. I got a property closin' this mornin', but I need the car this afternoon. How about you towin' it to the Model Garage and gettin' that danged thing out? If you don't go chargin' me too much, that is."

There were some spare parts he could pick up, Gus thought, so taking care of two chores in one trip.

"Be there within an hour, Silas."

With the parts aboard, Gus headed the tow truck for an outlying district where Barnstable lived. On the way, a siren screamed behind him. Gus pulled over to

let a fire engine pass. Before he could get under way again a black Thunderbird roared by.

When he came into view of Barnstable's house, it was framed against a backdrop of smoke and burning grass. The open field behind it was a sea of flame.

After backing up the driveway to Barnstable's sedan, Gus got out for a longer look. Three hundred feet away, the engine's hoses were already playing water on the flames. Two men with chemical extinguishers were tackling a utility pole that had caught fire. Beside his garage, dancing from foot to foot in excitement or rage, was Silas Barnstable.

"Keep cool, Silas," counseled Gus. "They'll have it under control fast."

"Took enough time to get here!" spluttered Barnstable, his Adams apple bouncing. "It started right after I called you. Only one engine, and no sign of Chief Maloney! I'm takin' that up with the town council. He ought to be on the job."

"Most likely he is—maybe at a worse fire someplace else," Gus pointed out.

That stray nut was safely removed,
but Gus had still another tough nut to
crack: suspicious Silas Barnstable



Beside his garage, dancing
from foot to foot in excitement
or rage, was Silas Barnstable.

ILLUSTRATION BY RAY QUIGLEY

a Mysterious Click

"He better prove that," snarled Silas. "I won't stand for havin' my property rights endangered by neglect. I'm a taxpayer and entitled to protection."

"You're getting it, Silas. Besides, if that isn't Chief Maloney himself, I'll tow your car to the shop free."

The burly figure of the town's fire chief had emerged from the haze of smoke.

"Lucky for him he's here. Don't see his car anyplace," grumbled Silas.

"I think he came in that Thunderbird," put in Gus. "Now about your car—"

"Just get out that plug nut. I'll pick up the car later. What'll it cost?"

"My tow charge plus a buck."

"Too much, but I got no time to argue. My lawyer's pickin' me up. Don't you do nothin' else, 'cause I won't pay for it."

By the time Gus had the car in tow, the fire was a smudge on the landscape.

Lifting the hood of the car in his shop, Gus found seven new plugs installed. The last one in the left bank was out; it lay in its carton on the seat.

As the terminal nuts were nonferrous, Gus couldn't use the thin magnetic retriever so often useful. With a thumb over the plug hole to feel compression, he nudged the engine over until the piston was at top dead center of the compression stroke, so insuring that both valves were closed. He then got the nut out of the cylinder in the quickest way possible, put in the spark plug, and snapped on its cable.

Soon after lunch, a turnpike call came in. Before Gus left, he spoke to his helper, busy on an automatic transmission.

"Barnstable's car is ready," he told Stan. "If he pays up, let him take it."

"Bet he beefs about it," muttered Stan.

But Silas made no difficulty about paying when he showed up half an hour later. His sour face expressionless, he got in and turned the key. The engine caught.

Its idle was immediately punctuated by an irregular *click-snap-click*. His face one furious scowl, Silas got out.

"Hear that? You're a witness," he barked. Snapping off the ignition, he raised the

Continued

hood up, glared down, then almost sniffed at the head bolts on the left bank.

"What work did Gus do?" asked Stan.

"He didn't do it!" snapped Silas. "I paid him to take out a plug nut I dropped in a cylinder. You see any sign there's been a wrench on them bolts? No, he put in the plug and left that thing in to bang around and damage my engine."

"Hold it," objected Stan. "If Gus says he took that thing out, he did."

"It's probably knocked holes in the piston by now," roared Barnstable. "I'll sue for repairs, I will. Won't do him no good when it gets around, either."

"It's probably just a tappet—"

Stan was interrupted by a series of

it gradually returned again to smooth idle.

"Can't go to fires in that car," said the Chief. "While the boys were cleaning it this morning I used my own car, but when they were done I let my wife take it. I need a quick fix on this crate, Stan. Never know when the next call may come in."

Getting a timing light, Stan detached and taped up the vacuum advance line, then hooked up the light. The flywheel mark was right at the arrow. Gingerly he advanced the throttle. The engine had another paroxysm before settling to about 1,000 r.p.m.

But the timing mark crept ahead, indicating the normal automatic advance.

In a sweat, Stan detached the light and hooked up the plug scope. As he again advanced the throttle, the eight traces leaped erratically, then settled to normal height. Apparently the plugs were okay. Stopping the engine, Stan unhooked the scope and removed the distributor cap.

There were neither cracks nor carbon

tracks in it. He let it dangle and checked the points, which were in good shape and properly gapped. Spring-arm tension seemed correct. Stan was thinking about the condenser when a metallic voice came from inside the car. The Chief answered. The voice squawked back, urgently.

"A two-alarmmer," snapped the Chief. At that moment Gus came in.

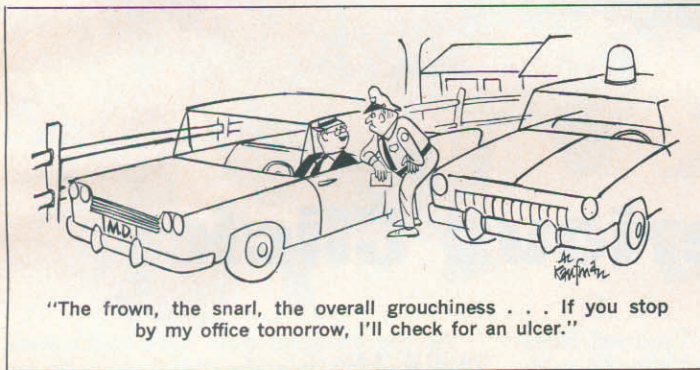
Chief Maloney explained in a few words. "I've got to get out, Gus. Fix it fast—or lend me your car."

"It's on stands for a brake job," returned Gus, pointing to the wheel-less car. "So is everything else but the wreck-er. Maybe Silas will let you take his."

"Not in the shape you left it in, Gus Wilson," growled Barnstable.

Gus turned the key in the Chief's car. The starter spun, only to stop abruptly with a dull thud. He got out and stared thoughtfully at the spotless engine.

"Mal, when was the engine degreased?"



"The frown, the snarl, the overall grouchiness . . . If you stop by my office tomorrow, I'll check for an ulcer."

violent backfires as a bright red coupe moved jerkily into the shop. It stopped, engine spitting and bucking. From it emerged Chief Maloney—and as he did, the engine settled to a smooth idle.

"Where's Gus?" bellowed the Chief.

"On a road call," replied Stan. "He should be back soon. Can I help?"

"Hey!" squawked Silas. "I was first. You got to take customers in turn."

"Not when I'm one, with an official emergency," said Maloney. "I heard about you beefing to the mayor about us not getting to that grass fire quick enough, Barnstable. Now you better pipe down."

The Chief turned to Stan. "She ran fine last night. When I tried to start this morning, the starter kind of jammed. Then when she did catch, she spit and backfired fit to bust the muffler. See how nice she's idling? Well, listen."

He got back in, touched the throttle, and the engine went into hysterics, back-firing and sputtering. When he got out,

"This morning. But what's that got to do with my trouble?"

"Get some alcohol and a rag, Stan," ordered Gus. He unsnapped the distributor cap and, when Stan brought the alcohol, dampened a rag with it and carefully wiped out the inside of the cap. After the solvent evaporated, he put the cap on.

"Try it now," he told the Chief.

Maloney jumped in, started the engine, and jazzed the throttle. It responded vigorously and smoothly. Without a word, the Chief roared away.

"Whoever hosed off the degreaser got careless," remarked Gus. "A little water got in the distributor."

"Wouldn't that have shorted out the ignition all the way?" protested Stan.

"Probably wasn't enough, just a thin uneven film that settled around the terminals inside the cap. That would make them act as if they were wider, so the spark jumped from the rotor to the wrong terminal at times. Once the engine ran a bit, the moisture would burn away and crossfiring would stop. But every time you changed speed and the spark advance worked, the spark occurred when the rotor was a few degrees around from where it had been. So it contacted new moisture and crossfiring started again."

"What about my car?" snarled Barnstable. "You never took out that nut. It's tickin' away in there, chewin' up the valves. I thought you weren't askin' enough for the job. When I looked, I saw you never took off that head."

"Could hardly do that for a buck, Silas. But I got the nut out."

"It ain't magnetic. So how could you, without takin' off the head?"

Gus unhooked an air hose with a few inches of copper tubing on its valve.

"I got the piston to top dead center with both valves closed," he said. "Then I stuck this tube in the plug hole. The air churned around inside and came out of the same hole, bringing the nut with it."

"Yeah? Just listen to this engine."

Barnstable turned it on. Immediately came the same *click-snap-click*. Gus opened the hood and grinned.

"Shut it off and come look, Silas."

As Barnstable did so, Gus turned the fan belt a few inches by hand, and pulled away a bit of fabric three inches long.

"There's your clicking noise. Every time it rounded the generator pulley, it slapped this antifreeze tag somebody wired in the engine compartment."

"I tried to pull that off," growled Silas. "But it needed pliers so I gave up."

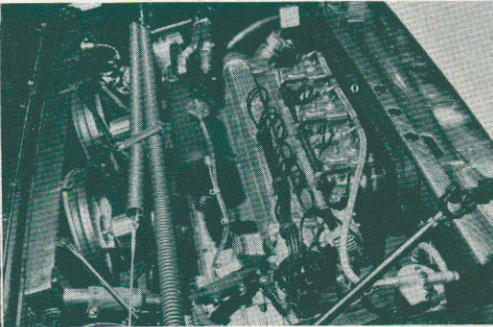
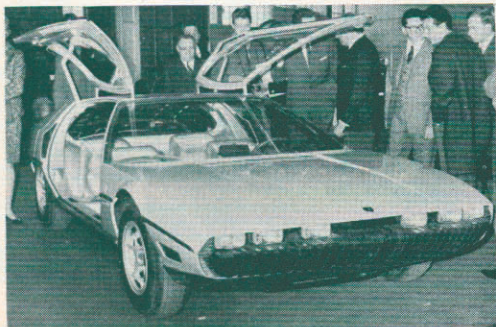
"After stretching it so it hung down enough for that belt flap to hit. That's why you never heard it before," said Gus, cutting off tag and flap.

"Now there," remarked Stan after Silas had left, "is a guy it's a pleasure not to do business with."

"He's stingy, cantankerous, and small. Except in one thing, Stan," said Gus.

"You name it," challenged Stan.

"When he goofs," replied Gus, "he really goofs big." P 5



An Italian Batmobile?

Massive gullwing doors and a fastback grille of honeycomb construction with flattened horizontal tubes gives the Lamborghini-Bertone Marzal its way-out look. The

straight-six engine is a longitudinally split V-12, mounted transversely in the tail. Half the original power plant—with transaxle—is enough to deliver 175 hp. Note the broad tail-end radiator, twin fans, and trio of twin-choke Weber carburetors.