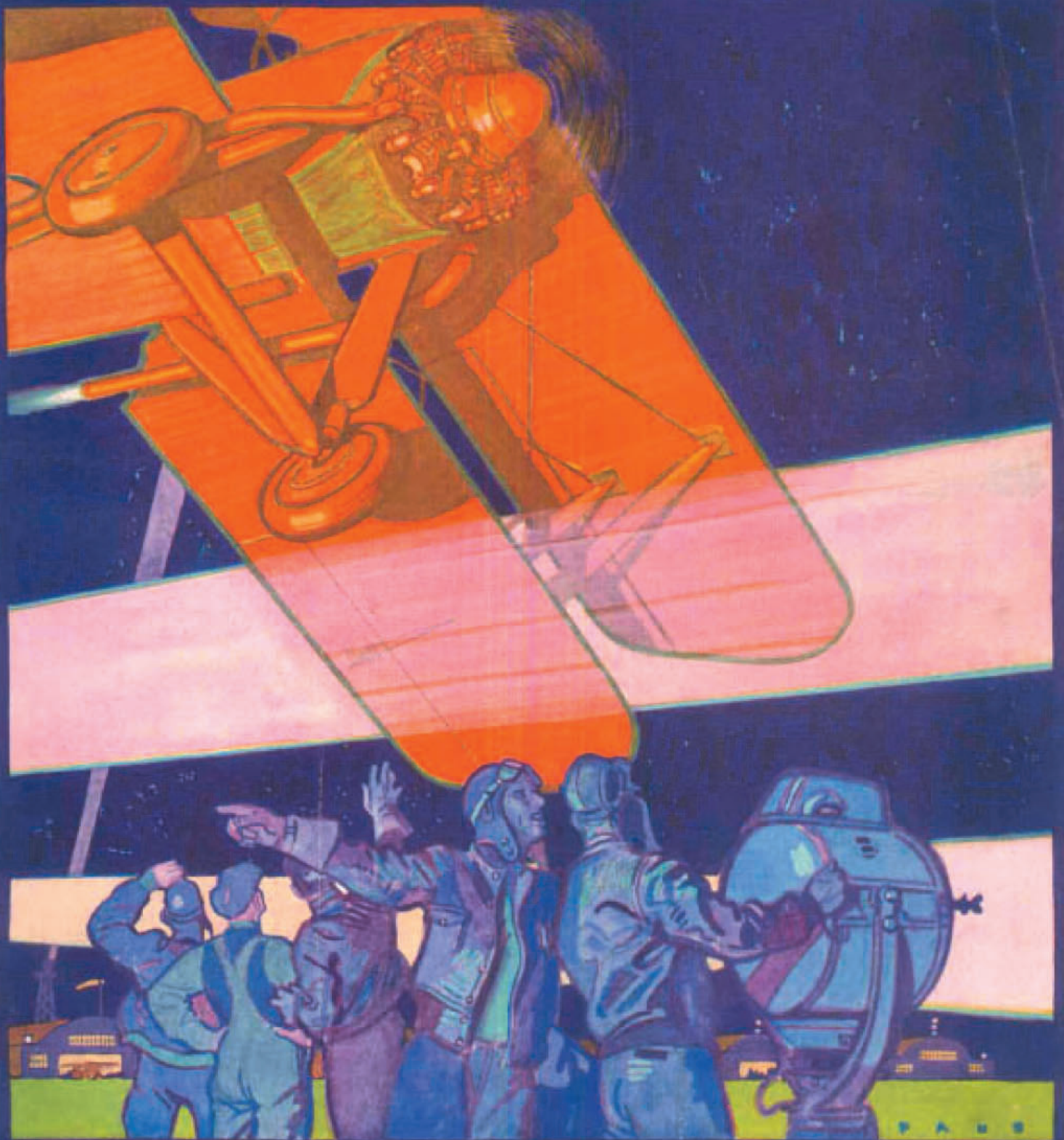


Popular Science

MONTHLY *Founded 1872*

July
1928
25 cents

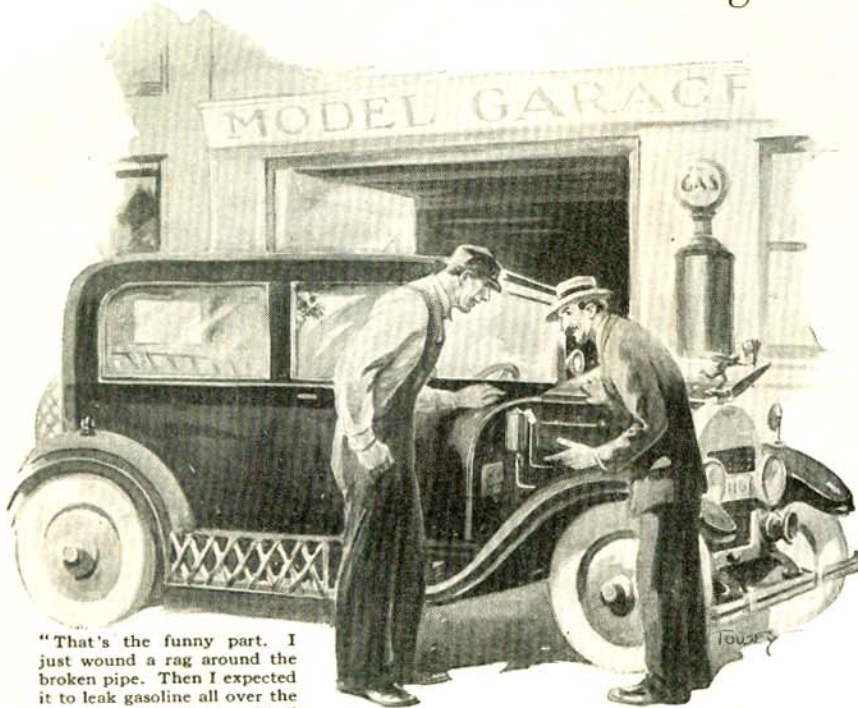


*In this
Issue*

5 Big Aviation Features

How "Bootleg" Gas Ruins a Car

Gus Tells Why You Can't Save Money by Buying Cheap Fuel and How You Can Guard Against Roadside "Gyps"



"That's the funny part. I just wound a rag around the broken pipe. Then I expected it to leak gasoline all over the place, but it don't even drip"

By MARTIN BUNN

HERE'S another long distance flyer down with a busted oil pipe!" exclaimed Joe Clark in the noon hour as he sat with the morning paper in one hand and a huge piece of chocolate cake in the other. "Those airplane motor manufacturers must be awful dumb if they can't even fit the oil pipes so they'll stay put."

Gus Wilson, veteran automobile mechanic and Joe's partner in the Model Garage, smiled sarcastically.

"Wake up, Joe!" he jeered. "Don't you know the poor old oil pipe always gets the blame when anything happens to an airplane motor? Of course the oil pipe can break, but lots of times it's just a phoney excuse to cover up a broken part in the motor—"

Gus was interrupted by the persistent honking of a most peculiar motor horn. "I'll bet you two cents that's Bill Craddock with another of his contraptions," he grumbled as he snapped the lid on his lunch box and started out.

Joe grinned. "Tell Bill if he puts much more junk on that bus there won't be any room for passengers," he called after Gus.

"How's that for a warning signal?" Craddock shouted in greeting. "Sounds like a cow or something, eh? It's only a tin flap over the horn, and when I pull the wire the flap lifts up.

"But," he continued, "that isn't what I came here for. I nearly didn't get here at all. The gasoline pipe busted on me and I had to tie it up with an old rag.

And the battery nearly quit before the motor started again."

The supply pipe from the main gasoline tank had broken off short where it entered the connection on the vacuum tank.

"Runs all right, now, it seems," said Gus as he fingered the rag winding.

"**T**HAT'S the funny part of it," agreed Craddock. "I just wound the rag on because I didn't have anything else handy. I expected it would leak gasoline all over the place, but it's not even dripping. What made the pipe break in the first place, and how in tophet can gasoline flow through there without running out through the rag?"

"Gasoline pipes—and sometimes oil pipes," Gus explained with a meaning glance at Joe, who had joined them, "break because the metal gets tired. In other words it crystallizes. A complete break like this one is rather rare. Lots of cars go all the way from the factory to the junk yard without breaking an oil or gas pipe. I'm not counting leaks due to loose connections, bum soldered joints, and so on. You can't blame them on the pipe.

"And," he went on, "the reason gasoline didn't leak out is because it only goes through when it's sucked along by the vacuum tank. In fact, the rag served to keep air from leaking into the pipe fast enough to spoil the vacuum, not to keep the gasoline from getting out. If that had been the pipe from the vacuum tank to the carburetor, you'd have had a steady stream of gasoline running out."

"Then it's a good thing that pipe didn't

bust," said Craddock. "Seems as though you can't carry enough tools and accessories to fix everything."

"No one could do that," Gus said. "Might be a good idea to put a package of chewing gum or a cake of laundry soap in the tool box, though. You can make a good temporary repair on a broken gas or oil pipe with a thick layer of gum or soap, bound with a rag or friction tape. A roll of friction tape and a spool of iron or brass wire ought to be in every tool kit," he finished as he set to work to fix the pipe.

"What made it start so hard after I got the pipe tied up?" Craddock questioned.

"The motor started hard because the vacuum tank was empty," explained Gus. "Of course, air leaking through the rag kept the tank from filling as fast as it otherwise would, but it takes quite a little cranking to get the tank full even when there's no leak. You could have saved the wear on your battery by priming the vacuum tank."

"**T**HAT'S one on me," confessed Craddock. "And I know the right way to prime it, too. Just take off the pipe from the vacuum tank to the manifold and suck on it till the tank fills up. Isn't that the best way?"

"A few years ago I'd have said yes, but now I'd say no," Gus replied. "There's always a chance that you might draw some of the gasoline into your mouth if the tank is on the bum, and you get the fumes in your lungs anyway. These new special fuels are fine food for motors, but some of 'em are poison for men, so it isn't wise to take a chance. If you haven't a spare can of gasoline handy, you can syphon off some from the main tank by dropping a length of rubber hose in the tank, pressing your thumb over the end, and pulling it out and down into the small can."

"None of that fancy stuff for me," Craddock snorted. "I buy plain, ordinary gasoline. And I get it just as cheap as I can. Gasoline is just gasoline and that's all there is to it!"

"**D**ON'T you believe it!" Gus exclaimed. "There's real good gasoline, ordinary gasoline, and rotten gasoline. Cut-price gasoline is almost sure to be rotten. And you can get stung even when you pay the full price."

"That's the bunk!" jeered Craddock. "You can't fool me. There's cheap gasoline in that tank and yet the motor is running about the same as usual. It doesn't knock any more than it ought to, considering it's full of carbon. I'm going to clean it out next week and then it won't even knock."

"It's your car," admitted Gus patiently, "and you can (Continued on page 113)

JOHNSON HAS GIVEN WINGS TO WATER TRAVEL

How "Bootleg" Gas Ruins a Car

(Continued from page 70)

run it on anything you want. But just remember that there's no such thing as 'pure gasoline.' All gasolines are mixtures—of liquids that are chemically different. Some kinds of gas are made up of liquids that evaporate real quick, and your motor starts easily when you use them; others don't burn so well. And into bootleg gasoline go a lot of heavy, cheap, hard-burning oils. A good part of it never burns, but gets down in the crank case and dilutes the lubricating oil. The explosions have no snap, so you have to open the throttle fairly wide to get ordinary driving speed. Also, the heavy compounds turn into carbon and gummy deposits.

"You get less mileage with bootleg gasoline," Gus continued, "so the cheaper price doesn't mean anything. The car starts harder, especially in cold weather, so you get more wear on the starter motor and the battery. The excessive crank case dilution means you either have to change your oil oftener or you wear out the moving parts faster, and to top it all, the cheap, bootleg gasoline probably contains sulphur. This turns into acid when burned in the cylinders and causes corrosion and extra wear, especially on the cylinder walls, piston rings, pistons, and valves."

"WHY should they want to substitute the heavier liquids if they don't burn well?" asked Craddock. "And it ought to be easy enough to filter out the sulphur."

"The heavier oils down to kerosene and even below that—the kind of stuff suitable for use in oil burners—are used to dilute the mixture and make it cheaper. And you can't just filter the sulphur out like straining dirt out of water. It takes a costly chemical process to get rid of the sulphur, as the big refining companies can tell you."

"Maybe you're right," Craddock grudgingly admitted. "I do have to adjust my carburetor every few days, and now that I think of it, I've had to adjust for less gas each time I've bought expensive gas."

"And I'll bet the oil in your crank case is diluted till it has no more body than so much dish-water!" asserted Gus.

Craddock, now thoroughly alarmed, decided to have his crank case drained. The lubricating oil flowed out swiftly, and proved but little thicker than kerosene.

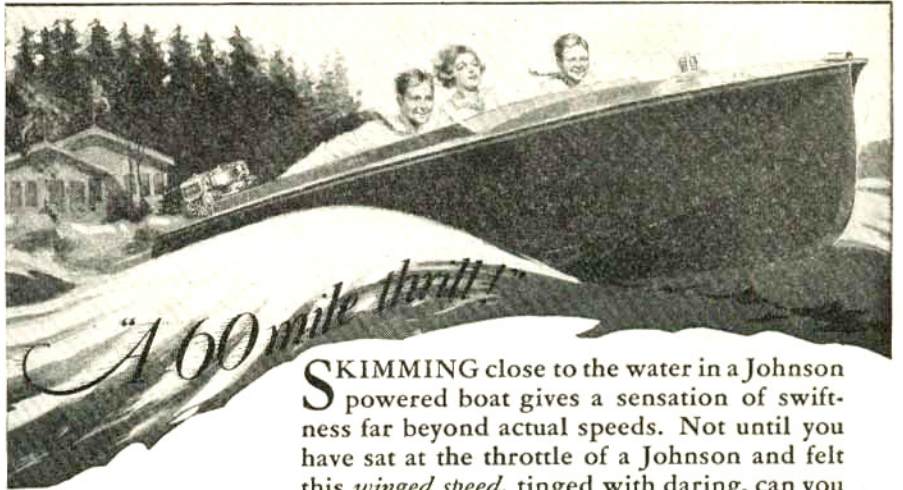
"You win, Gus," Craddock grunted as he inspected the black, smelly liquid, "but how am I to tell when I'm getting good gas? It all looks alike, and you say that some of the worst bootleg gasoline comes out of pumps that are labeled with standard brands."

"WHENEVER you can, buy your gas near home where you know the dealer is honest," Gus recommended. "Jim Barrows, who has a filling station out near your place, is as square as a die. He'll give you what you pay for. Then if you have to buy gas on the road, find a filling station that's run by a refining company. Whatever you do, stay away from these pumps stuck in front of candy stores, hot dog stands, and so on."

"The special, high test gasolines and ethyl gasolines that cut down the knocking save wear on your motor, especially on the connecting rod and wrist pin bearings, and you actually get more mileage. You won't need to have the carbon scraped so often and you'll be able to go faster on the level and up hills."

"By cracky, it ought to give new life to this bus if it will do all that," Craddock observed enthusiastically.

"It does if the motor is in good mechanical condition," agreed Gus. "But no gasoline is going to cure leaky valves, bum compression, and bad ignition. You can't cure broken bones with medicine, you know!"



SKIMMING close to the water in a Johnson powered boat gives a sensation of swiftness far beyond actual speeds. Not until you have sat at the throttle of a Johnson and felt this winged speed, tinged with daring, can you know what boating really is.

Write for the booklet "What You Should Have in an Outboard Motor" FREE!

JOHNSON MOTOR CO., 2563 Pershing Rd., Waukegan, Ill.
Export Division: 75 West St., New York City

IN CANADA
Canadian Johnson Motor Company, Ltd., Peterborough, Ontario
Distributors: Peterborough Canoe Co., Peterborough, Ont.
Hoffars, Ltd., Vancouver, B. C.

5 models of Johnsons— including family, fishing and racing types; \$115 to \$275. Sold on free trial and payment plan. All prices F.O.B. Waukegan, Ill.

Johnson
Outboard Motors

WORLD'S LARGEST MANUFACTURER OF OUTBOARD MOTORS

BULLY Revolver LIGHTER

Something Different!

An exact reproduction of a small automatic revolver. Pull the trigger and you have a light instantly—works every time. Very easily operated—fits vest pocket. Gun metal finish with ring at bottom for chain. Makes an ideal gift.

Send No Money Just name and address. Reg. \$5 Value. Pay postman only \$1.79 plus postage. Satisfaction GUARANTEED or Money Back.

ESTON MANUFACTURING CO., P. O. Box 688-S Birmingham, Ala.

A SHIP MODEL FOR \$4.98

Build an exact replica of the historic Santa Maria, the Mayflower or the La Plata with your own hands. We will furnish the parts complete for only \$4.98 plus a few cents for postage. No tools needed except a small hammer. Parts for the Constitution (Old Ironsides) may be had for \$6.98. Write for our illustrated catalog.

MINIATURE SHIP MODELS
Dept. O-9, 3818-24 Baring St., Phila., Pa.

PARKS
WOODWORKING MACHINES

Cabinet Shop Special No. 10 \$290 with Motor

You ought to have this handy Parks in your shop. Compact, complete machine designed like a big production outfit at 1/5 the cost. Fits in a corner of your basement. Does any kind of cabinet or joinery work. Write for circular.

The Parks Woodworking Machine Co.
1547 Knowlton St., Cincinnati, Ohio
Canadian Factory: 208 Notre Dame East, Montreal

DIAMONDS **WATCHES**

The Old Reliable Credit Jewelers

LOFTIS BROS. & CO. 1828

Genuine Diamonds Guaranteed—Cash or Credit

Tremendous Diamond values! Buy from Loftis, the Direct Importer, and be sure of highest quality and most value for your money. Our ring mountings are the latest creations in 18-k white gold, elaborately carved and pierced. Satisfaction guaranteed, or money back. Goods sent for your free examination on request. Credit Terms: Pay one-tenth down; balance weekly, semi-monthly, or monthly at your convenience. All goods delivered on first payment.

Send for Free Catalog!

Big 132-page book, illustrating our Diamonds, Watches, Jewelry, Silverware, and gift articles for all occasions, sent absolutely free. Write today.

19-Jewel Adjusted Waltham No. 846—14-k white gold filled; assorted patterns, \$42.00 \$4.25 down and \$1.00 a week

Railroad Watches—Guaranteed to Pass Inspection HAMILTON No. 992 21 Jewels, Adjusted to 5 postive gold \$55 filled 25 Yr. Case \$55 Credit at Cash Prices

Our References: Any Bank or Banker in U. S. A.

Dept. B871
108 N. State St. Chicago, Ill.

No. 849 \$100 \$2.50 a wk.
No. 851 \$50 \$1.25 a wk.
No. 852 \$37.50 \$3.25 a wk.
No. 859 \$100 \$3.25 a wk.
No. 847 \$150 \$3.75 a wk.

No. 824 "The Elite" \$7.50 18-k white gold.
Set with 15 Diamonds \$22.50; 5 Diamonds, \$32.50; 7 Diamonds, \$42.50; 9 Diamonds, \$52.50; 12 Diamonds, \$67.50