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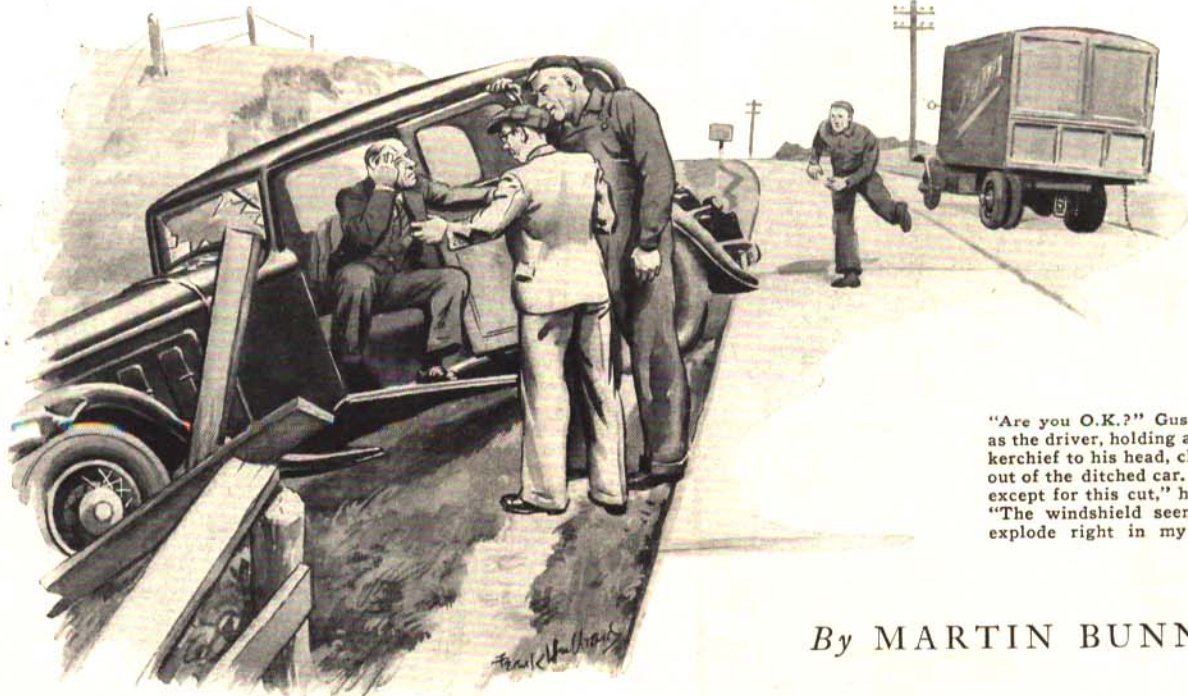
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"Are you O.K.?" Gus asked as the driver, holding a handkerchief to his head, climbed out of the ditched car. "Yes, except for this cut," he said. "The windshield seemed to explode right in my face"

By MARTIN BUNN

# Auto Glass that's Crash-Proof

**B**RAKES screeched and horns sounded as a blue sedan whizzed past the Model Garage tow car, cut in sharply to avoid a truck, and crashed through the white fence bordering the well-paved highway.

For a moment, Gus Wilson and his partner, Joe Clark, were speechless. Then Gus slid the garage car to a stop and both men hurried back to the wreck. The driver of the truck trotted toward them from the opposite direction.

"Are you O. K.?" Gus asked as a small man, holding a red-stained handkerchief to his face, climbed out of the ditched car and stood grinning sheepishly.

"Except for this cut," said the man, uncovering a gash over one eye. "The blamed windshield seemed to explode right in my face when I hit that fence. Guess I lost control. I didn't see that truck when I started to pass you."

"We'd better get you to a doctor," the truck driver put in. "Cuts like that are nothing to fool with."

"Aw, the cuts all right. How about the car?" he asked as he surveyed the wrecked machine in the ditch.

Aside from a shattered windshield and a badly crumpled fender and headlight, nothing vital appeared to be damaged. Gus Wilson bent the mangled mudguard clear of the wheel and climbed into the driver's seat.

"A busted windshield sure contains a heap of glass," remarked Gus as he carefully brushed the glass splinters from the seat. "The whole car's sprayed with it."

"You're telling me?" said the injured driver. "When I hit, that windshield just disintegrated. I'll be picking it out of my hair for months."

Gus carefully backed the car onto the road. "Joe," he said, "suppose you drive Mr.—er—"

"Kennedy," supplied the man. "Live just a few blocks from your garage."

"Suppose you drive Mr. Kennedy home in his car and I'll follow in the wrecker," continued Gus. "And if I were you, Mr. Kennedy, I'd see a doctor first thing. The car can wait. Bring it around tomorrow and I'll look it over. Probably all its needs is a new windshield and a little ironing out on that fender."

**G**US was standing in the garage office doorway the next morning when Kennedy, patched and bandaged, arrived. "Well, here I am," he called in answer to Gus's greeting. "Now that I'm all mended, I guess I'll treat the car to a few repairs."

"How's the cut?" Gus asked, indicating the bandage over Kennedy's eye.

"Fine. Doc says I'll have a scar, though. Had to take four stitches to close it up."

Gus drove the car into the repair shop and started a systematic inspection of the wheels, brakes, and steering gear.

## GUS says:

You owe it to yourself, your family, and the other drivers on the roads to see that your car is as safe as you can make it. Steering gear failures, tire blow-outs, and poor brakes cause as many bad accidents as reckless driving. If you call yourself a safe driver, be sure your car's controls respond quickly. A fraction of a second's delay may mean a bad crash instead of a harmless scrape.

"Looks like your car got off easier than you did," he said as he tested the wheel bearings. "Outside of that busted windshield and folded fender, she's O. K. If that windshield had been as up-to-date as the rest of the car, you'd have escaped without a scratch."

"How come?" Kennedy asked. Gus said nothing as he ambled across the repair shop and disappeared through the storeroom door. When he reappeared, he was holding two squares of glass.

"See any difference between these?" he asked holding out the two glass sheets.

Kennedy held the two samples to the light, looking first through one and then the other. "They look alike to me," he said, "excepting for the black strip along the edge of this one."

Gus propped the two sections of glass on the repair bench, picked up a heavy wrench, and stepped back about four paces. "Now watch," he said.

Swinging his arm in a wide arc, he flung the heavy wrench at one of the glass squares. Kennedy ducked as glass showered down on the repair bench.


"What did you expect it to do, bounce?" Kennedy said, obviously puzzled by the strange performance.

Without answering, the gray-haired mechanic tossed the wrench at the second square of glass. Cracks darted from the point where the tool hit, but the glass did not shatter. Instead, it held its shape as the wrench rebounded.

"Say!" exclaimed Kennedy. "I've seen shatter-proof glass before, but it was always brown and cloudy-looking. I thought those two pieces of glass were cut from the same sheet."

"If you'd had a windshield made of that stuff," said Gus, "you'd have saved a doctor's bill and a mean gash over your eye to boot." (Continued on page 92)

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# WORLD'S FIRST STEAM-DRIVEN AIRPLANE

(Continued from page 11)

Superchargers, driving a blast of air into the carburetor to make up for the reduced pressure in rarefied atmospheres, help these gasoline motors. They are heavy, however, adding to the weight of the plane, and they never completely prevent loss of power at high altitudes.

Now consider the steam engine. It loses no power at all with altitude and gains in efficiency the higher it goes! This is because the pressure on the exhaust is less in thin air than at sea level. Thus the perfection of the flying steam engine is a vital step toward conquering the stratosphere.

Realizing these facts, inventors in various parts of the world have been working toward the goal achieved by the Besler brothers. In Akron, Ohio, last fall, a local inventor, Harold C. Johnson, announced the completion of a steam engine with two opposed cylinders, weighing, complete with boiler, only 146 pounds.

Some months earlier, it became known that the Great Lakes Aircraft Company, at Cleveland, Ohio, was working upon an experimental steam-driven biplane. Recent dispatches from France reported that a Paris mechanic had perfected a light steam power plant for airplanes. Another news item, coming from Sweden, told of steam-turbine engineers who are working on a new-type turbine for aircraft use, while a third, from Italy, carried the information that G. A. Raffaelli, an aeronautical engineer, had announced a steam engine for stratosphere machines.

But it was the two California inventors, carrying on their secret researches, who first achieved the long-sought goal of steam-driven flight.

Ever since Henri Giffard, in 1852, navigated the air in the world's first dirigible, creeping along near the outskirts of Paris at seven miles

an hour propelled by a clumsy three-horsepower steam engine weighing 462 pounds, there have been proponents of steam power for aircraft.

Many of the pioneers of flight, before the perfection of the gas engine, sought to fly by steam. In 1894, Sir Hiram Maxim, the English inventor, spent \$200,000 building a gigantic multiplane weighing 8,000 pounds and having a wing area of almost 4,000 square feet. Driven by a 363-horsepower steam engine and two eighteen-foot propellers, the giant craft reached thirty-six miles an hour on special tracks built to hold it down during the preliminary tests. Its lift at this speed was so great that it tore loose from the tracks, crashed over on one side, and demolished itself.

Two years later, Samuel Pierpont Langley, secretary of Smithsonian Institution, Washington, D. C., saw his sixteen-foot model fly for half a mile above the Potomac River propelled by a miniature, seven-pound steam engine, developing one and one-half horsepower. The full-sized tandem monoplane which Langley patterned after this model in 1903 and which was broken in launching, carried a gasoline motor instead of a steam power plant.

After 1903 and the success of the Wright Brothers, steam power for aircraft was practically lost sight of. Gasoline engines made such rapid advance in lightness and reliability that they came into universal use in aviation. Recently, however, the advantages of steam power have again been attracting an increasing amount of attention.

With the first experimental machine already climbing into the air at Oakland, steam has, at last, been harnessed to work in the sky. Experts are watching the progress of the inventors with the keenest interest. Their machine is a definite step toward the huge, winged steamers of the sky visioned by pioneers of flight.

# AUTO GLASS THAT'S CRASH-PROOF

(Continued from page 56)

"What's the secret of the stuff?" inquired Kennedy as he examined the cracked surface of the safe glass.

"It's no secret," replied Gus. "Safe glass is made of two polished pieces of plate glass cemented to a center sheet of transparent plastic material like celluloid. This center sheet is tough yet pliable and holds the outer and inner glass in place when it cracks.

"THIS black edging," Gus continued, "is a waterproof cement that seals over the edge of the plastic filler. After the two sheets of plate glass and the center sheet are bonded together under pressure and heat, the sheet of safety glass is dipped in acid. The acid eats away the plastic filler and forms a shallow groove around the sheet. When cement is forced in this groove, the plastic center is sealed in airtight. Moisture and air can't get at it."

Joe Clark, standing in the garage doorway, listened intently as his partner explained the process. "Do you know how they discovered the stuff?" he called when Gus had finished.

"About thirty years ago some French scientist was using a sort of liquid celluloid in his work. One day he forgot to cork the bottle. Of course, the liquid evaporated and left a thin layer of celluloid, or something like it, on the inside of the glass bottle. He put the bottle aside and forgot about it until one day he accidentally knocked it from the shelf. It crashed to the ground, but instead of smashing to bits, it shattered, holding its shape. The hardened liquid held the cracked bits of glass in place. That gave him an idea and shortly after shatterproof glass

was developed."

"But doesn't all glass of that kind get discolored after a time?" Kennedy inquired.

"Nope," Gus told him. "The seal I just told you about stops discoloration to a great extent and a new type of transparent filler sheet has been developed that's not affected by the sun's rays. Good shatter-proof glass will stay clear as long as it's intact."

"I don't doubt that safe glass is a wonderful thing," Kennedy agreed, "but it costs a lot of dough."

Gus shook his head. "But it's an investment, a safety investment," he pointed out. "Fifty percent of all the injuries in automobile accidents come from flying glass. Twenty or thirty bucks isn't much to spend to make your car fifty percent safer to ride in, is it? One good smash-up, when you have a car full of people, will cost you a lot more than that in doctor's bills alone.

"YOU'RE paying a doctor right now and accidents like yours can happen any time. Generally it won't be your fault, either."

"I guess you're right," said Kennedy after a pause. "Suppose you fix my car up with it. With children in the family, safety means something."

"Just the windshield?" Gus asked glancing at Kennedy.

"Not on your life!" Kennedy replied. "If I do it at all, I'll do it right. Put in safe glass all round."

"Fine!" said Gus as he wrote out the order. "Safety isn't something to buy in parts. Put it in front, back and sides and driving a car will be less of a worry to you."