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The design and fabrication of the jerrycan—Part I

A history lesson with all the makings of a Hollywood blockbuster

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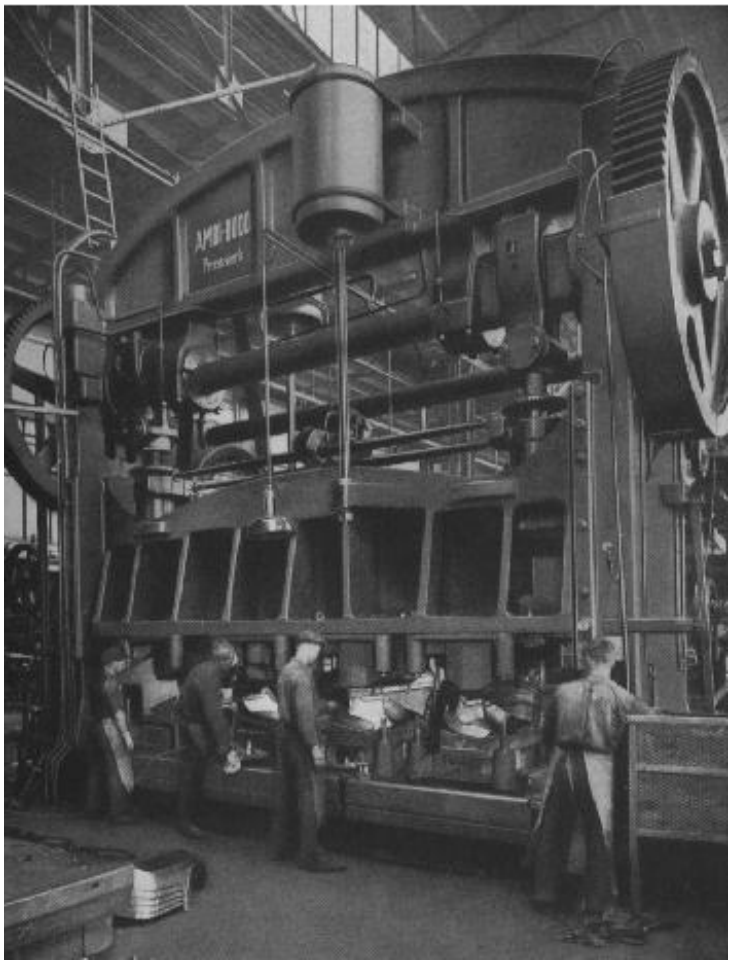
BY JOSH WELTON

The plan was to write a concise two-part series about how I turned an old military water canister, a "jerrycan," into a rocket stove. In doing so I thought, "Hey, maybe a little background on the thing would give the project a little context." I knew nothing of the jerrycan and its origins. A quick Google search should do the trick, right?

Instead I tripped and fell head-first into a series of rabbit holes. The story has all of my favorite things: crazy road trips; timeless design; metal fabrication; and a Nazi classified, secret weapon. What more could you want?

Perhaps an international man of mystery? This particular gentleman just might be the original "Most Interesting Man in the World." If you know the history of the jerrycan, you probably think you know who Paul Pleiss is and how he was involved. You'd be wrong.

Then, of course, there is the jerrycan. It's a small steel vessel that's typically used to carry fuel or water in the military or on overland expeditions. The name points to its origin, as "Jerry" was a slang term for Germans used in the early 20th century by Allied forces.



ABP Ambi-Budd Presswerk image found at http://jerrycansoftheworld.blogspot.com/2010/12/abp-ambi-budd-presswerk.html?m=1.

Some recent stories attribute the term to U.S. forces, but the Brits seem a more likely source: "One explanation derives from the hastily assembled, or 'jerry-built,' contraptions mocked by the British, while another stems from the way the German military helmet represents a chamber pot (jerry) or jeroboam (a wine bottle four times the normal size). A more prosaic explanation is that it's a shortening of German" (https://www.radiotimes.com/news/2014-02-18/dont-mention-the-jerries-bbc-changes-world-war-one-programme-title/).

Germany developed the small tin in the 1930s to transport essential liquids during time of war, replacing old designs of basic triangular and rectangular shapes. Hitler demanded the upgrade; his evilness was rivaled only by his genius. He instructed his people to suss out the new design. They put out an “invitation to tender,” a competition, to come up with the slickest can. Through experience, Adolf and his advisers knew how critical a smoother, more efficient way to move fuel and water would be in their attempt to subjugate the world. If you can’t effectively lubricate your men and machines, then you’re not gonna last long in battle, especially in wars that were becoming increasingly far-flung and mechanical. The can’s apt original name, *Wehrmacht-Einheitskanister*, is German for “armed forces unit canister.” Vinzenz Grünvogel, chief engineer with the firm Müller of Schwelm, is credited with devising the winning canister. It might look simple, but there’s more to the design than meets the eye. The *Wehrmachtkanister* is form and function at its zenith.

“Developed under the utmost secrecy, the jerrycan featured flat sides that were rectangular in shape and was made in two halves that were welded together like an automobile fuel tank. It had three handles, which allowed it to be easily passed from one man to another; had a 5 U.S. gallon capacity, and weighed 45 pounds when full.

“Other distinct features included buoyancy in water, thanks to an air chamber at the top, and elimination of any need for a funnel, thanks to a short spout which was secured by a snap closure and could be popped open for pouring. A gasket made the mouth leakproof; pouring was easy and smooth, thanks to an air-breathing tube from the spout to the air space, and the inside of the can was lined with an impervious plastic material, which enabled the container to be used for fuel and water.” (https://www.cfla-alfc.org/stories/the-history-of-the-jerry-can/?)

The two flat sides of the can were stamped with a large X shape, aiding in both the can’s rigidity and its ability to weather changing temperatures, along with the gas volume fluctuations that came with them.

The canister’s eventual manufacturer, Ambi-Budd Presswerk (ABP), came up with how the stamped halves were pressed and joined. This was a vital piece of the can’s success. The shape of the stamping placed welds in recessed joints right down the middle, where they were protected from abuse. ABP’s stamped pieces included rounded 90-degree corners that took away the stress you’d find on a sharp 90-degree edge. On top of that, it was a design that was quick and simple to produce. Easy to make, easy to handle, easy to stack, easy to transport, durable, and efficient. This thing was brilliant.
Meanwhile, the British and U.S. forces were utilizing their respective ill-thought-out containers nicknamed “flimsies,” There was no elegant solution, just a legion of light-gauge sheet metal pieces joined at harsh right corners with poorly welded, exposed seams. They were a hassle to carry and ruptured quite easily, neither of which are sweet attributes when transporting fuel under fire. And whereas the jerrycan is a self-contained unit, the flimsie required a wrench to open it, a spout to pour liquid out, and a funnel to receive liquid. “So poorly designed and manufactured, most were only able to be used once; they were then being modified for stoves, or filled with soil and used as makeshift sandbags.” (https://www.carryology.com/utility/carry-history-the-wwii-jerrycan/).

Despite the can’s obvious deficiencies in design and immeasurable failures, when presented with the answer in the jerrycan, the U.S. government ignored it. How they received this answer is a bizarre tale worthy of the Hollywood treatment.

“Early in the summer of 1939, this secret weapon began a roundabout odyssey into American hands. An American engineer named Paul Pleiss, finishing up a manufacturing job in Berlin, persuaded a German colleague to join him on a vacation trip overland to India. The two bought an automobile chassis and built a body for it. As they prepared to leave on their journey, they realized that they had no provision for emergency water. The German engineer knew of and had access to thousands of jerrycans stored at Tempelhof Airport. He simply took three and mounted them on the underside of the car.”

Sneaky. Keep in mind that up until this point the Wehrmacht had gone to great lengths to disguise and camouflage the cans. They alone counted for a valuable advantage over the Allied forces.

Jerrycans in production.

"The two drove across 11 national borders without incident and were halfway across India when Field Marshal Goering sent a plane to take the German engineer back home. Before departing, the engineer compounded his treason by giving Pleiss complete specifications for the jerrycan's manufacture. Pleiss continued on alone to Calcutta. Then he put the car in storage and returned to Philadelphia.

"Back in the U.S., Pleiss told military officials about the container, but without a sample can, he could stir no interest, even though the war was now well under way. The risk involved in having the cans removed from the car and shipped from Calcutta seemed too great, so he eventually had the complete vehicle sent to him, via Turkey and the Cape of Good Hope. It arrived in New York in the summer of 1940 with the three jerrycans intact. Pleiss immediately sent one of the cans to Washington. The War Department looked at it but unwisely decided that an updated version of their container would be good enough. That was a cylindrical 10-gallon can with two screw closures. It required a wrench and a funnel for pouring."

At some point an official at Camp Holabird came to possess one of the jerrycans, and at long last, the U.S. did try to copy the can. They skipped key design elements, however, which made the new tin as bad as the old. There was no improvement. Some people have a hard time seeing the forest for the trees.

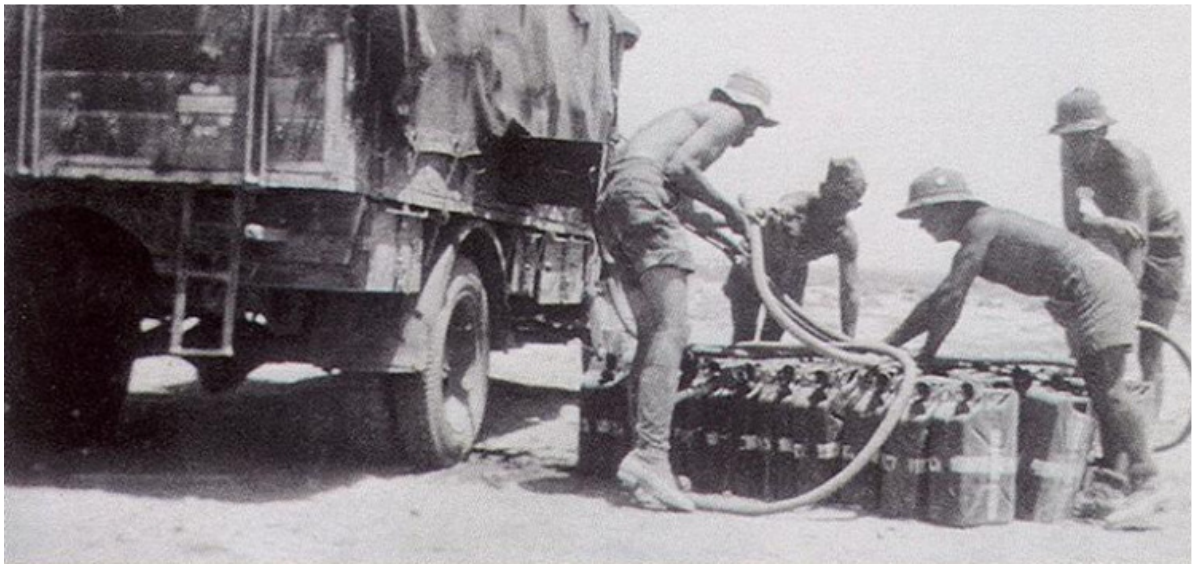
Pleiss was an adventurer; in fact, I just read his essay on road tripping (in the same custom-built car) through South America, which was featured in the February 1943 edition of *The Geographical Journey*. While the Americans were busy not giving a hoot about these jugs, Pleiss was busy talking them up in England. If his Yankees wouldn't succumb to reason, perhaps he'd find a willing party across the Atlantic. The Brits had been

scavenging all the Nazi cans they could because, well, the German tins were awesome. They were curious as to how much info Pleiss had on them:

“Pleiss was in London and was asked by British officers if he knew anything about the can’s design and manufacture. He ordered the second of his three jerrycans flown to London. Steps were taken to manufacture exact duplicates of it.”

But again, nothing happened. Instead, Euro Allied forces continued to “capture” as many German vessels as they could, and it’s all they would use. The British military wasn’t at all happy that their government wouldn’t manufacture the things themselves.

Meanwhile, the U.S. was still fabricating and using garbage flimsies. Yeah, there were slight mods to the previous versions, but they still leaked and exploded and required tools to use. Chemical engineer Richard M. Daniel is the source for some of this part of the story. He was a quality control official at an American refinery in the Middle East, and by late 1942, the U.S.’s can’s flaws and consequences were too glaring to let slide. Battles were lost due to and victories won in spite of them. Daniel and a colleague filed a report saying some 40 percent of fuel was being lost in transport just because of the cans. “The 40 percent figure was actually a guess intended to provoke alarm ... it worked.”



Jerrycans in use

A next generation of the American fuel canister was scrapped as everyone finally got on the same page and agreed that the Germans had gotten at least this much right. In preparation for a European invasion, the U.S. conceded production to Britain, which by 1944 had set up shop in the Middle East and was pushing legit jerrycans out in the tens of millions. At one point during the war there were around 200 factories worldwide that produced them. Late in ‘44 President Roosevelt stated that “without these cans it would have been impossible for our armies to cut their way across France at a lightning pace, which exceeded the German Blitz of 1940.” Hitler must have freaking loved that!

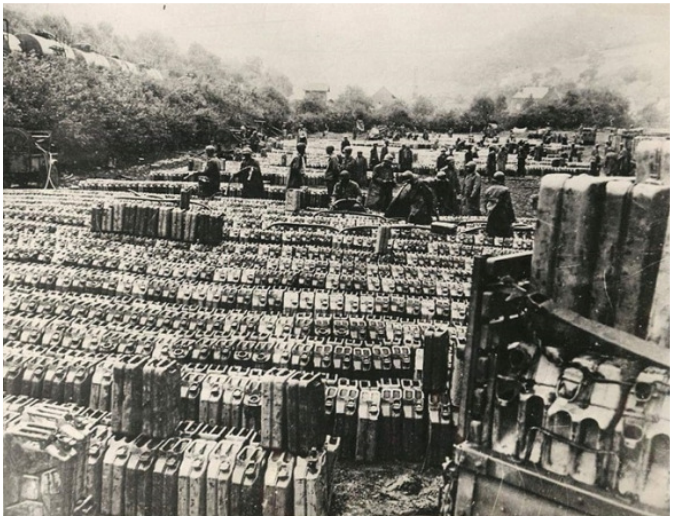
Daniel noted that very little about the jerrycan is of official record in Washington. According to him, there is one line in a report: “A sample of the jerrycan was brought to the office of the Quartermaster General in the summer of 1940.”

He’s not exactly right. In the Quartermaster Corps report put out in 1953 (volume 1, pgs. 143-144), another few paragraphs were dedicated to the can, although it’s mostly referring to the 1940 modified version that came from Camp Holabird. It’s the one Daniel derided, which the Army called the “blitz-can.” The report also says the Army received a “captured” can from Britain, then described the Allied forces’ eventual copy in 1942, an

"updated" version of their blitz-can, not the jerrycan. There is no official record of Paul Pleiss' road trip, and some believe it is fiction. I think there's more to the story.

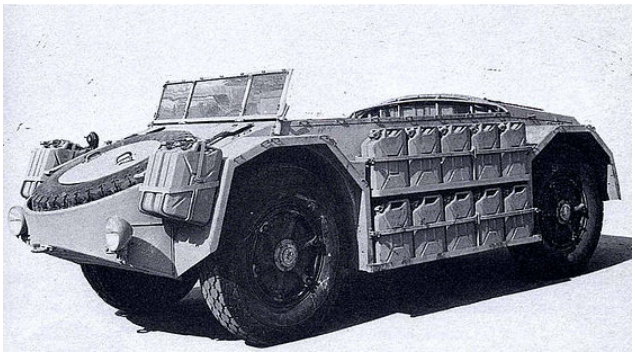
Stay tuned for Part II.

All images provided by Josh Welton obtained from his internet research.



Stockpile of jerrycans

Versatile jerrycans



Jerrycans being transported

Stockpile of jerrycans

Jerrycans on a tank

Paul Pleiss and his custom car that carried hidden jerrycans in WWII