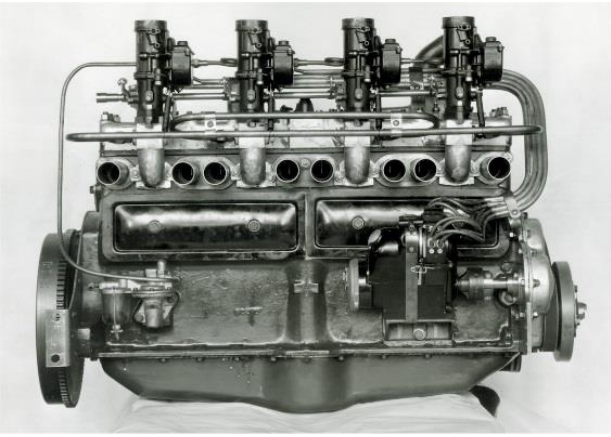
It was only a motor mount, but what a story!

Since the 1920s, at least, Studebaker engines have rested on rubber and steel motor mounts. They're usually made from two steel plates with a rubber block vulcanized in between. Installed between the frame and the engine, they isolate and absorb vibrations from the engine. Sounds simple, but a lot of engineering and development went into to making them work well.

While constructing my replica of a 1932 Studebaker Indy car using a 250 cubic inch straight 8 block from a 1937 sedan, I was faced with the problem of how to construct the supporting steel pieces and install functional motor mounts. The original Indy cars had the big 337 cubic inch straight 8 produced from 1928-1933. After the success of independents like Russ Snowberger with the big eight cylinder engine at Indy, the Studebaker factory encouraged the construction of the Hunt-Jenkins Special in 1931, and then built four copies of the car for the 1932 race. The same five cars raced again in 1933 with new bodies. The big eight engine block was cast with wings front and rear that enabled it to be solidly bolted to the Indy car frame rails with very simple steel supports – no rubber. This permitted the engine block to stiffen the chassis.



However, production of the big eight was terminated in 1933, and Studebaker had hopes for campaigning the smaller 250 cubic inch in 1934. Engine development was started, but receivership ended the funding of the racing program before the 1934 race. Existing engines were sold off at $750 each. One even wound up in a British-built sedan. Fortunately, a set of excellent photographs captured the details of these 250 cubic inch racing engines.

I chose to use a 1937 engine because it had insert bearings in the connecting rods, as well as on the nine crankshaft mains. This was the last year that the water pump was mounted on the left side of the block, driven by the back end of the generator, so it still looks like the 1934 engines. What I had not realized was that the method of mounting the engine had changed to improve sound levels and comfort in the sedans. So, I found that there was now a stamped steel, V-shaped assembly at the front of the engine that rests on a single rectangular rubber and steel mount. At the rear of the engine, two ½-inch bolts go down through the back of the bell housing to engage a pair of vibration isolators between the housing and the frame.

So, I had a choice: make a new set of large, precision-machined end plate assemblies with wings to replicate those on the 1934 racing engine or build some simple rectangular steel tube cross members to use the 1937-style production mounts. For now, I took the easy way out and drew up designs for the cross members. Dennis Dupont was able to provide a complete set of "new old stock" isolators and small parts. All I had to do was figure out the right way to install them on the new cross members.

The front isolator was simple enough: it's a rectangle of two steel plates about 9 inches long with a 1 inch thick rubber block between them. Two bolts go up to the block, two bolts go down to the cross member. The two rear mounts were different. Rubber domes go just under the bell housing pads and small donuts go under the cross member. The bolt goes through everything, secured by a nut and cotter pin at the bottom.

On closer inspection, the dome has a steel ring vulcanized to the outside and a big steel washer at the top of the dome. The smaller donut has steel washers vulcanized to its faces. Additionally, a short steel tube gets inserted through the dome and donut with the bolt passing through it. Now, how was this all supposed to function as an efficient vibration isolator?

The domed element, Studebaker part 195801, also had "Pat. 1977896" and the Firestone "F" logo molded into it. A quick Google search produced a copy of the patent, issued to Curt Saurer of Akron, Ohio in 1931 and assigned to Firestone Tire and Rubber Co. The patent revealed the intent: when the car hit a bump, driving the chassis upward, the dome was compressed. As it compressed further, more area of rubber contacted the load surface and the dome got stiffer. The bonded steel ring on the outside kept the rubber from escaping sideways. On the rebound, the lower donut, Studebaker part 180437, applied drag to dampen bouncing. The interior hole of the donut had been molded in a shape to create the drag at just the right time as the other parts moved. The washers on the faces kept the rubber from fretting as the parts moved.

Oct. 23, 1934. C. SAURER 1,977,896

RESILIENT MOUNTING

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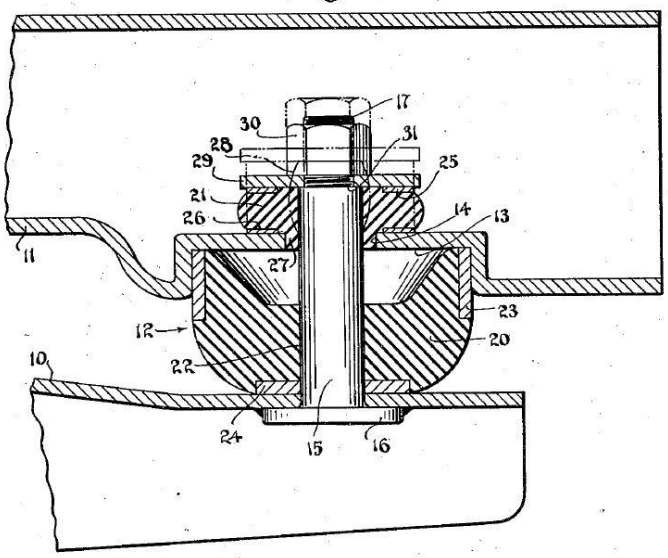
Fig. 1

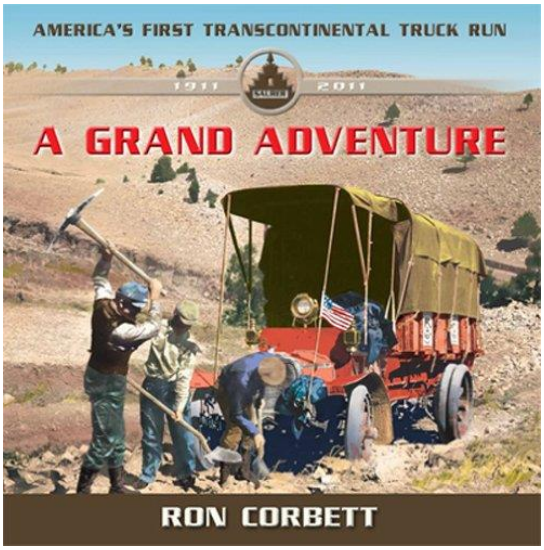


It was clear that some careful thought had gone into these mating parts. I then Googled for more information about the inventor, Curt Saurer. This turned up more than 50 patents in his name, covering the years 1921 to 1964. Many were for vibration isolators and other rubber parts, assigned to Firestone, but there were some assigned to other companies and some were held directly in his name. There were interesting ideas here – a rubber universal joint, a fender made from rubber to resist dents and rust, a water faucet with a special rubber seal, a differential assembly that locked up when needed by generating hydraulic pressure from an internal pump, and more.

I had clearly found a guy who thought about a lot of automotive things and who understood technology. But, where did he come from, and why had he worked for so many different companies? More Google searching revealed Curt was born in 1894 in St. Gallen, Switzerland, home of the company F. Saurer & Sons. The company made special Jacquard sewing and weaving machines, but started production of gasoline engines in 1896 and cars in 1897. By 1903, they were focused on making trucks, and soon started a U.S. subsidiary in Plainfield, NJ. They merged with Mack Brothers Motor Car Company in 1911 to form International Motor Truck Co. The Saurer brand was discontinued in the U.S. in 1918.

The oldest Curt Saurer patent, filed in 1921 and issued in 1926 for a motor mount, was assigned to International Motors of New York, and showed Saurer was a Swiss citizen living in Manhattan. There were two other named inventors on that patent, August Leipert and Alfred Masury. Masury had worked for Saurer Truck, became a key designer at Mack Truck, and later

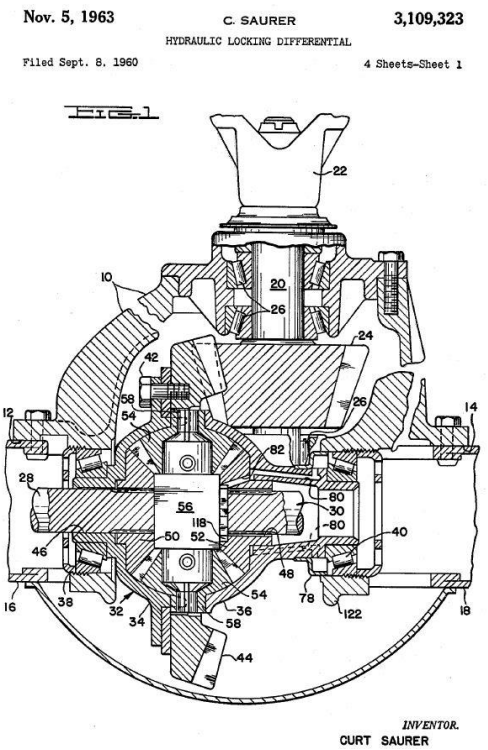
carved the original Mack bulldog ornament out of a bar of soap. Unfortunately, Masury died in 1933 in the crash of the airship Akron while serving in the U.S. Army Reserve.



Saurer trucks were known for reliability. To prove it to the public, a drive across the country was planned in 1911. A 4-1/2 ton truck was sent by train to Denver to do the hardest part of the route first. It made it over the Rockies to Los Angeles and then to San Francisco. It went by train back to Colorado – no point in repeating that trip! – and then drove east to New York. This five-month trip was the first transcontinental drive by any motorized vehicle. You can read the story in a 2011 book, "A Grand Adventure", by Ron Corbett.

Curt was a nephew of the company owners, and apparently came to the New York area to work for the merged companies. The company changed its name to Mack Trucks, Inc. in 1922 with its headquarters in Allentown, PA, but it kept the Plainfield plant operating for many years. At some point, rubber magnate Harvey Firestone met Curt and offered him a job in Akron. Mack Trucks were left behind, but rubber had a glorious future.

The numerous patents from his years at Firestone show an evolving mastery of the properties of rubber. He learned to use its springy characteristics by shaping and molding the rubber, reinforcing it with fibers, and bonding metal parts to it by vulcanizing. One of my Google searches turned up a technical paper, "The Engineering Properties of Rubber", which was presented as a broad overview of automotive applications of rubber at the Society of Automotive Engineers annual meeting in Detroit in 1935. It's still available from the SAE archives. Curt kept on working and inventing until he died in 1964.


Nov. 5, 1963 C. SAURER 3,109,323
HYDRAULIC LOCKING DIFFERENTIAL
Filed Sept. 8, 1960 4 Sheets-Sheet 1
FIG. 1
INVENTOR.
CURT SAURER

Curt and his wife Vera lived many years in the Detroit area. Curt's son, Curt Saurer Jr. (1924-2011), also spent his working career in the auto industry, and his grandson Curt Saurer III also spent his career at GM's Detroit Diesel and Eaton. I was able to call Curt III and get

much of this information from him, as well as the photo of his grandparents.

But, what of Curt's legacy? That pair of domed part and donut were used on many Studebaker vehicles over the years for motor and transmission mounts. They work inverted and rearranged. I think the first use of the parts was in the 1934 cars (same basic design, different part number). The parts were used on Dictators, Commanders, and Presidents through the 1930s and 1940s, and the same numbers were used on Studebaker trucks through the final 1964 model year. The vibration isolating mounts are still available from Studebaker parts vendors for less than $20. What a great tribute to a person who lived to create useful, practical things from something as basic as rubber!

And, as Paul Harvey used to say, now you know the rest of the story.

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