# REPLICATING A GIANT KILLER

## Building a Porsche-Powered Beck 550 Spyder

**By Bruce Smith**

The chances of seeing a Porsche 550 Spyder in Upstate New York are pretty slim. So, twenty-five years ago, when a friend told me there was one on display at the Autoworld vintage car museum in Brussels, I took some time away from a business trip to Belgium to get a look. The museum is housed in an elaborate complex built for the 1880 Belgium National Exhibition and contains more than 250 European and American automobiles from the late 19th century to the present, with notable collections of early French- and Belgian-made vehicles.

**Above: Though the perspective here is a bit deceiving, the Spyder replica is noticeably smaller than a 356. The width is 61 inches and length is 146 inches. For comparison, the 356B is 65.8 inches wide and 158 inches long. The wheelbase is actually larger, at 85 inches compared to 82.7 inches. Still, with my 6-foot, 2-inch height I have no problem fitting or getting in and out.**

After an hour or so at Autoworld looking over some great cars, including many I'd never seen before, I finally came across the exhibit for their 550 Spyder. It was a disappointment. The car on display wasn't a real Porsche 550, but a replica of some sort, and not a very good one. It was surrounded by a display that mimicked a racetrack setting, but unlike most other cars at the museum, the area around the car was cordoned off, keeping visitors about ten feet from the car and, presumably, less likely to notice it was a fake.

This was my first sighting of a 550 Spyder knock-off and, although I was generally unimpressed, it got me wondering if there might be a market for a well-built replica. I hadn't heard yet about a guy named Chuck Beck, who had been working on doing just that since the early 1980s. As of this writing his company (now Special Editions in Bremen, Indiana) has been making Spyder kits and replicas for several decades. Others have gotten into the game

**The Spyder body at Special Editions, after body work in primer (left) and after single-stage paint in classic Porsche 356 colors (right).**

as well, like Vintage Motorcars, Spyder Creations, and Thunder Ranch, each offering their own specialty to the replica market.

I had admired Porsche Spyders since they could be bought for well under a hundred grand (some club old-timers could probably knock that down ten-fold). But with their increasing values, affording one was always out of my reach. When they hit the one-million mark I knew I would never own a real one. And now, with most selling for well over $5 million, I think I'd be too afraid to drive a genuine 550 anyway. You hear stories about Cobra owners keeping their real cars garaged and driving replicas; the same might be true today for these special Porsches. So, that left me with two choices: stop dreaming or consider a replica car.

## Faux or No?

A basic problem I've had with replica or kit cars is that they tend to pretend to be something they're not. Should a car display a badge of a company that didn't build it? What about a manufacturer that recreates an earlier model? Is it acceptable to badge exact replica cars? Where do you draw the line?

Whether a car is a copy of a Cobra, a Jaguar, a Bugatti, or a Porsche, I suppose it's fine if it's made clear that the car is not the real deal. A big plus for replicas is that they can allow for ownership of a car that may otherwise be unobtainable. But a problem with some of the lesser-built kit cars is that they merely provide the appearance of an original. Remember the whole array of replicas of vintage European makes that were built on VW chassis? These were twenty-footers at best; getting into and driving a bug-based 1952 MG TD, 1927 Bugatti, or 1937 Jaguar SS must be a real buzzkill. The value of these cars today is indicative; they've become hard to even give away.

But, as with good Cobra replicas, something interesting has happened with well-built 550 Spyders. Those assembled with VW pans and drivetrains aren't as desirable, but those built ground-up on custom tubular frames and designed similar to the original cars are not depreciating from new. Quite often you'll see them sell well above their original prices. The powerplants for most replica Spyders are VW Type 1 motors, modified with big-bore kits to displacements anywhere between about 1600 and 2300cc. Alternatively, some cars use water-cooled 2.5L Subaru flat-four engines of 165 bhp or more. The strong values of good used Spyder replicas suggests that they are being coveted and have a strong following. So how about a Spyder with a real-deal Porsche motor?

## As Close as is Practical

So, I'd been thinking for a while about building a Spyder as a kit project, and doing it in a way that might come close to how an original may have driven, yet be upfront that it's not a Porsche. The Beck replicas make it possible to achieve nearly original-style frame construction and body, using a tubular steel frame (originally patterned for the 550 and closely based on the earlier Glöckers) and a fiberglass shell molded from an original car. Dimensions are a slight bit larger—imperceptibly so—granting more room in the cockpit (the wheelbase is 85 inches vs. 82.7 inches). To approach the powertrain of an original car would require obtaining a Fuhrmann four-cam Type 547 motor, designed new for the Type 550 but valued today at probably 20 times the cost of the entire rest of the car. But the first Type 550 Spyders were built with existing Porsche pushrod motors—hopped up Type 528 1500 Super engines with twin-throat Solex carbs, fitted with external oil coolers, and with redlines close to 6,000 RPM. These motors reached 98 bhp DIN at the 1953 pre-Le Mans tryouts by burning alcohol with compression ratios up to 12.5:1, and were raced at Le Mans at 9:1 compression and 78 bhp using gasoline. Pretty serious, considering more "normal-spec" motors normally ran at 7:1 ratios and produced 55 bhp. A top speed of 124 mph was reached through the Mulsanne Straight at Le Mans in 1953 by car 550-02 using a pushrod motor, back before chicanes were added to that section of the track.

However, sourcing an original 1500 motor would also lead to an expensive build, and it'd be crazy to try to beat anywhere near that much horsepower out of one. Using a 1600 Porsche Type 616 motor from a 356 or 912 could be a practical alternative. It would provide plenty of power for the street, together with proven reliability.

Because Spyder kit cars are designed to fit a VW motor, it's not too big of a challenge to make the modifications needed to situate a Porsche 616 engine. The case size is a bit bigger, some linkages are different, engine electrics aren't quite the same, and exhaust flanges need modification. But if you've got some of Harry Pellow's books, you'll know VW-Porsche or Porsche-VW motor swapping is quite doable, especially when no engine tin is involved. This combination of a 616 motor into a 550 replica wouldn't be the first, but it isn't very common, and each installation is a custom job. This certainly would make for a good project, and a result somewhat better than most of the rest once competed.

## Putting the Pieces Together

I started a plan to build a bare-bones, mid-engine Beck 550 Spyder, avoiding the trap of adding fancy bling that serves little purpose other than visual appeal. I opted for a four-speed VW Type 1 transaxle mated to the Porsche 616 motor. I would undertake a complete rebuild of the engine and use a lightened 200mm flywheel from Kennedy Engineering to marry it to the VW transaxle.

I'd take on as much of the build as possible, relying on Special Editions for the frame and suspension assembly, bodywork, paint, interior, wiring and harness, and shell mounting. Special Editions configures a kit package that includes the chassis with an adjustable front beam, control arms, torsion bars, stacks and spring plates, a laminated fiberglass body with front bonnet, doors and rear deck lid, all mechanical parts, brakes, steering, gauges, wiring harness, windshield, paint, seats, and upholstery. That encompasses most of the parts needed to build a complete car except for the motor, engine electrics, transmission, wheels, and tires, and a few odds and ends along the way. The supplied gauges are recent replica VDOs with a GPS speedometer/odometer to eliminate the complication of cabling a mechanical one.

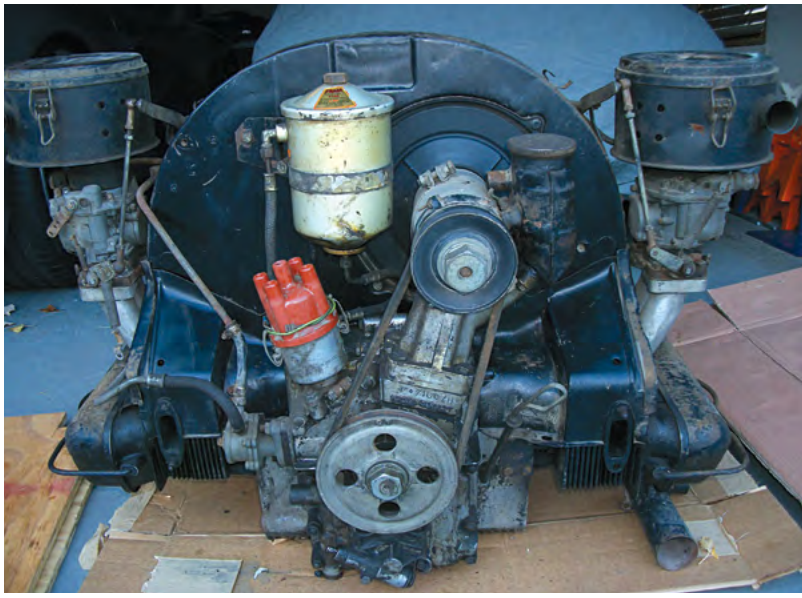
I went with very few options but did order two windshields—a standard full-frame version and a cut-down, plexiglass racing windshield. One of the requirements to title a car in New York state is a full-framed safety windshield with working wipers (more about this later). My plan was to convert to the smaller race windshield once the car got through the registration stage. I opted to source a steering wheel myself and found that Nardi makes nice replica 380mm Anni mahogany wheels. As far as paint colors, rather than going with the silver that you see most often, I chose one of my favorite 356 colors: 1957 Stone Grey. I'd use single-stage paint and combine this classic color with 1956 Polyantha Red spears. The interior would be dark red leather with oatmeal square-weave carpeting. Special Edition's current price for such a "Deluxe Body Package" with all of these parts, interior complete, and painted is a bit under $25K. So, after several conversations with Carey Hines at Special Editions, I placed an order. I visited their factory in Bremen, Indiana, a couple of times and was impressed with the quality of their workmanship and their upfront approach to dealing with customers.

After about eight months, with constant updates from Carey along the way, the body on frame was ready to transport home, with all of the parts either mounted or in boxes. I rented a U-Haul trailer and, with my son, made the nine-hour trek there and back home to Rochester. We unloaded everything into the garage, ready to start our part of the build. I'd build the car mostly based Special Edition's kit parts but would change out or customize a few things along the way.

## Addressing the Engine

While waiting for the body to be completed, I searched around for decent candidate motor to rebuild. I had considered a 912 motor that I had in the garage (a 616/40), but then found a better early 356C motor (a 616/15) for sale in Pennsylvania. Every old engine comes with a story, and this one had a few of them, changing each time I talked with the seller. Bottom line, it appeared to have come out of a wrecked early '64 C more than 50 years ago, was then installed in a Bug for a few years, and then was removed and left sitting in a corner of a garage ever since. It turned over by hand and, from the outside, looked like it had been tinkered with and neglected but might never have been taken apart. So I took a chance, loaded it up, and brought it home.

Tearing into the engine a few weeks later showed that it indeed hadn't been apart before, and it looked to have relatively low miles.



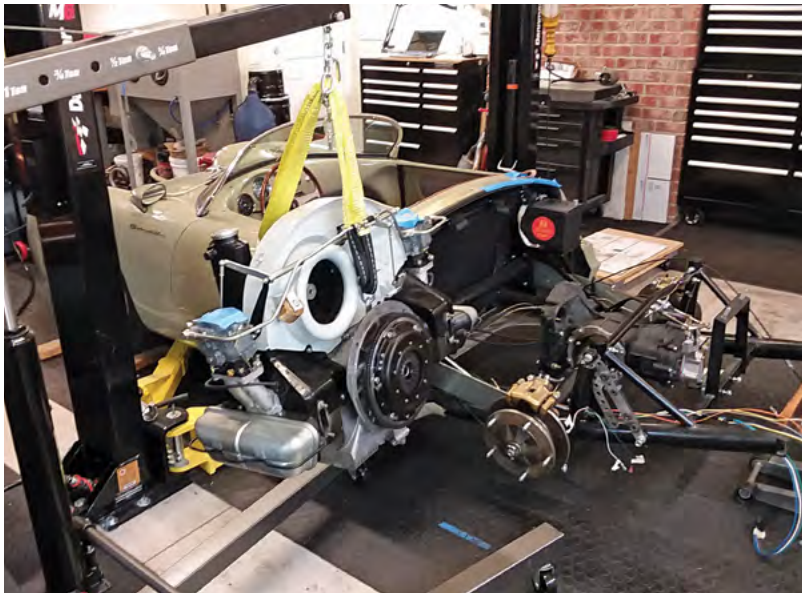
**The 356C motor I dragged home from Pennsylvania before finding out how good things looked inside.**

I sent the case, crank, cam, and heads to Walt at Competition Engineering. I got it back, cleaned and measured, with the heads skimmed, new valves and springs, and a mild regrind to the cam. Everything else checked out fine. I was able to find some NOS Mahle 82mm pistons and cylinders and basically built the motor back to C-spec stock. I set it up for a standard 8.5:1 compression ratio, which probably delivers about 88 bhp SAE.

With a measured curb weight of 1,480 lbs, the weight-to-power ratio of the car would be about 16.8 lbs/bhp, better than early 911s until they reached 140 bhp (with the 2.0L for 911S and 2.4L for 911T, for example). I rebuilt the original Zenith PO19/19.1 carbs, Bosch generator, and the APG fuel pump, and fit a rebuilt BR18 distributor that I had on hand. I installed new bearings, a new aluminum oil cooler, balanced rods, polished crank, a Precision Matters sump plate, and new temperature and pressure senders. I cleaned and DIY plated all of the hardware and blasted/painted

**The 356C motor, after cleaning and machining, during assembly.**

The Sebring exhaust mounted to the 616/15 motor, wired up for three-stage break-in on the test stand, during which I checked for leaks.



The 356 motor goes in from above using an engine hoist. This is a piece of equipment that doesn't get much use in the garage full of Porsches! The Type 1 transaxle is mounted to adjustable spring plates with short axle tubes. A Wilwood hydraulic clutch replaces the original clutch cable assembly. Disc brakes are installed at all four wheels.

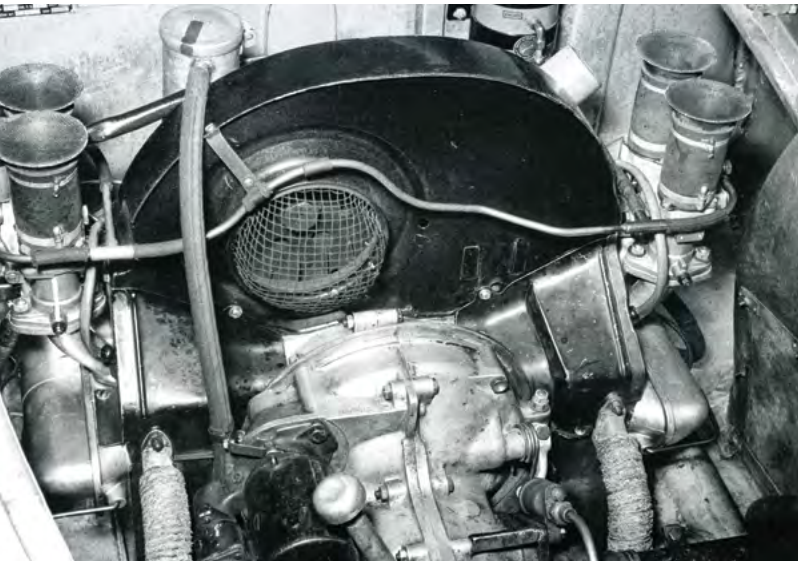
Motor mounted, custom fuel lines, cables, hydraulic lines, and wiring installed, ready for installation of the rear clamshell.

all of the tinwork. The original-dated, small-diameter Bosch generator that came with the engine was 12V, which must have been an option early on during Porsche's conversion from 6V. This was a convenient discovery during the teardown; it meant I needn't make modifications to accommodate the 12V gauges and electrics furnished with the Special Editions package.

After assembly, I broke in the engine with successive 20-minute runs on a test stand, gradually increasing RPMs and correcting for leaks before mating it to the transmission with an engine hoist from the top (rarely the routine for a 356 motor).

The exhaust that Special Editions sells is a Sebring design using a pair of Magnaflow mufflers with custom J-pipes, headers, and mounting hardware. These exhausts are built for use with VW engines, which are a bit smaller than a Porsche 616, with oval exhaust flanges instead of rectangular ones. This required some modifications to the lengths and ports of the tubing, especially

The C-style oil filler was cut down to allow the body clamshell to shut. The 12V voltage regulator and a glass bowl fuel filter were installed at the firewall. A new VW starter was used with the 12V, 200mm flywheel ring gear.



**Twin-throated carburetors are seen in the specially-tuned 1500 Type 528 engine of one of the original early Porsche 550 Spyders (left, credit *Porsche Spyders: Type 550 1953-1956,* Rodolfo Mailander, Ludvigsen Library Series, p. 11, 2002). My 616/15 motor is shown as installed in the Beck Spyder, with Zenith 32NDIX carburetors and 28mm venturis. Custom throttle cabling can be seen mated to the 356 throttle linkage (right).**

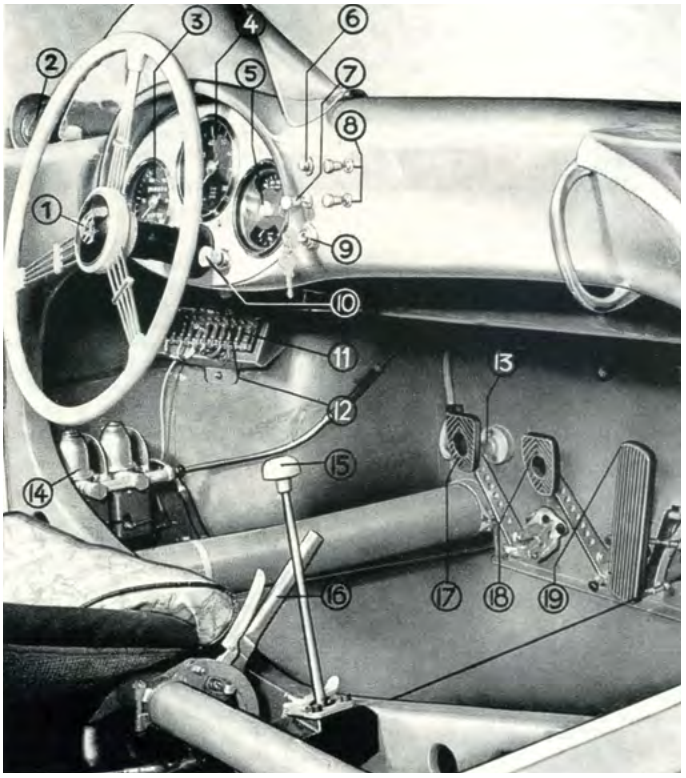
challenging as there is very little room between the exhaust manifold and the rear axle.

On the test stand, the sound coming from the Porsche motor through the Sebring exhaust was extraordinary! Low and throaty, with all of the normal sounds of the flat-four resonating just right through the pipes and baffles of the dual exhaust. No matter how good you think any 356 sounds with whatever exhaust it's feeding, I bet it doesn't compare to the notes coming out of this combination. I've since had as many compliments about the sound of the car as I have about anything else.

As mentioned, I decided on a VW transaxle for the build instead of a Porsche transmission, which saved a bunch of money. I had Rancho Performance Transaxles in Fullerton, California build a late Type-1 swing axle (they call it their Pro Street setup) and had them set up the gear ratios for the RPMs, wheels, and tires I'd be using. As strictly a street car, there wouldn't be much difference between the performance of this transmission and a Porsche one, and the cost was significantly lower. I fit a Sachs late-style throw-out bearing, mounted a 200mm clutch and pressure plate to the flywheel, and

**Firestone F-560 155R15 tires on 5 1/2 x 15-inch steel wheels. Wheels were media blasted, painted silver, and mounted over Fibersteel aluminum wheel skins at all four corners.**

**The ball-joint front beam and steering components are derived from the VW design, along with a shortened steering column. Front and rear rotors, calipers, and the brake master cylinder are parts from wide-five disc brake conversion kits.**




**Dash instruments and controls in the original Porsche Type 550 Spyder (left, from the Porsche 550 owner's manual) and the Beck Spyder at right. Gauges in positions 3, 4, and 5 are new electronic VDOs, with GPS for the speedometer and odometer. Noticeably missing is the dual Autopulse electric fuel pump (14); I opted instead for the standard APG mechanical pump location at the motor. The steering wheel, pedal assembly (17, 18, 19), dash knobs (6, 8, 10), wipers, and footwell flooring were modified from those provided in the kit.**

installed a Wilwood hydraulic clutch and a PBS cable shifter box—with cabling to the shifter for the four gears plus reverse. Setting up the shifting took a bit of trial and error, but it was still easier than setting up a shift coupler from scratch in a 356.

I mostly followed 356 conventions in the engine compartment, color coding the wiring and using most of the fuel lines that were original to the motor. A new Bosch 12V voltage regulator was mounted to the firewall, along with an old-style glass fuel filter. The throttle linkage was kept as simple as possible using motorcycle-type cable fittings to transition to the throttle levers on the motor and accelerator pedal. Flexible nickel/copper hydraulic lines for the brake and clutch cylinders run through the short tunnel to the pedal assembly.

For wheels, I had what I needed in the attic: a set of 3/62 date-matched Lemmerz 5 1/2 x 15-inch steel wheels. I media-blasted them, painted them silver, and mounted skinny Firestone F-560 155R15 tires. I had originally mounted Firestone Classic 550/16 bias ply tube tires on 3.5 x 16 replica wide-five steel rims, but discovered that the tire height didn't clear the front wheel well, so I needed to scale back to a 15-inch diameter.

The 12V dash gauges that came with the car are nice, modern, 100mm, face-lit copies of originals, made by VDO. The MPH/KPH speedometer is GPS-driven and uses an antenna that is concealed under the dash. The electric 8,000-RPM tachometer (with a 6,200-RPM redline) is driven off the coil, and the combination gauge is like the originals, incorporating oil temperature, fuel level, and (LED) warning lights. I've replaced the starter and headlight switches furnished with the kit with ones with a nicer design.

Setting up the suspension required a lot of back-and-forth with string, levels, and tape measures—an old-fashioned but tried and true method. The front is set with slight toe-in and negative

**A toolkit based on the style and content of a '55, with some new and some old tools. The hardware and finish on the wiper arms were improved over those supplied with the car.**

camber. With the mid-engine configuration and the axle out back, the rear end is loaded very lightly, making camber a bit of a moving target. The goal is slight negative camber, to be set after driving a decent way on level pavement. The rear spring plates are adjustable to achieve this, and the resulting ride height is a function of the camber setting.

## The Legal Stuff

Titling a kit car is different for every state. Some states allow these cars to be titled as a "1955 Porsche." Not New York state. They do make it possible to get the car legal, but it's not especially easy. Working with a DMV is difficult enough, but the titling and registration of what NY calls a "custom vehicle" needs to be done by mailing a series of forms to Albany, the state capital. There is a specific sequence of events that needs to happen just the way the state demands.

Titling the car came first, which required the car to be equipped with all DOT- or SAE-approved lighting, brakes, horn, mirrors, muffler, windshield, wipers, turn signals, hazards, tires, seat belts, speedometer… you get the idea. But NY also requires a windshield defrosting device, bumpers, sun visors, and a padded dash. Look at the pictures of the car, and you can see how these could be showstoppers.

This is where one needs to get clever. Simply claiming the existence of these things isn't enough, because photographic proof needs to be submitted to Albany, which is followed up with an examination at a facility run by the New York State Troopers. I was able to meet requirements by affixing some temporary parts (i.e., a clamp-on 12V blower, some old 356 visors, and a homemade padded dash cover), and providing documentation from Special Editions that the chassis provided structural crash protection.

In all, the car needed to be trailered to inspections three times before it was eligible for registration: first for a weight certificate, then for a state vehicle examination, and then for a safety inspection. Several months after starting the process, I was finally able to title and register the car as a "2020 Custom." No choices here. It couldn't be titled as a Beck, and, although the factory's certificate of manufacture calls the body type a Beck 1955 Spyder, it can only carry the year that it was completed. But that's fine, as that's what the car is: a 2020 Custom.

## The Finished Product

Hopefully, the description I've given of the car sounds enticing: a Beck kit car replica of a 1955 Porsche 550 Spyder, with a Porsche 356C motor, a cool Porsche paint color, dated Lemmerz steel wheels, and an awesome sound from a Sebring-style exhaust. I decided from the start of the project that I'd not put any Porsche badging on it. Spyder emblems are on the front fenders, but the term Spyder is a generic term, similar to Roadster. The engines in our 356s don't have any visible indication that they are Porsches either. Unless one knows, or asks, it's not immediately obvious. As a member of both the Porsche 356 Registry and the Porsche Club of America, I've added an old Registry badge to a rear engine grille, and I affixed a small PCA sticker at the bottom-right corner of the windscreen.

Now that the car is finished (or nearly so, as I'm still tweaking things), I decided to hold off on swapping the windshield to the cut-down Plexiglas racing one. This swap really changes the look of a Spyder, and I'm not quite ready to make the modification.

I assembled a toolkit to replicate the tools that would have come with a car in 1955, but it only shows the markings of the particular tools. So, when asked what the car is, the answer is simple: "It's a Beck mid-engine Spyder." It's got a 1963-built, Porsche flat-four pushrod motor. It's a lightweight, direct car to maneuver, and gives immediate feedback. Its top speed betters 100 mph, but it might take some nerve to get there. It looks great, it sounds very cool, and it's a blast to drive. 356

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