

GEAR & GADGETS

Proving Its Metal

Why demanding cyclists are opting for costly, custom titanium frames



VICIOUS CYCLE Crisp's bespoke titanium frames start at \$4,300 and can take up to a year to craft—that is, if you can make it through the artisan's stringent evaluation process.

By Lee Marshall

THOUGH STEEL, aluminum, wood, bamboo and magnesium alloy have all been used to craft stylish bike frames, carbon fiber is today the go-to for serious cyclists with lots of cash. Glued and reinforced by epoxy resin, it can now be mass-produced and shaped to achieve an optimum balance between weight, comfort, aerodynamic performance and a mystic quality known in cycling jargon as “stiffness” that efficiently transfers power from your legs to the wheels.

Lately, however, a carbon-fiber alternative—first used to shape posh frames in the early 1970s—has attracted a small but influential cult following: Let us all praise titanium.

Combining the best qualities of flexible steel, corrosion-resistant aluminum and light-yet-stiff carbon fiber, titanium is increasingly seen as the ideal way to balance speed and comfort. “It manages to be very smooth while still being stiff,” said James Ralson, editor of Australian cycling magazine *La Velocita*, adding that titanium can reduce fatigue during long rides or defiant sprints down gravelly stretches.

“I’ve ridden everything from American carbon bikes to Italian steel,” said Jake Rosenblum, North American marketing director of hip cycling apparel brand Rapha, who recently bought a bespoke titanium bike from Colorado builder Moots. “For me, nothing meets all the demands [like] titanium.”

The material didn’t always have performance cachet. When Mr. Rosenblum first started riding ti-

tanium rigs, they were considered prosaic, “the quintessential choice for dentists and doctors,” he said.

Today, titanium is still associated with saying *ahh-hhh*—but in a different way. At the affluent, design-conscious end of the road- and mountain-bike market, titanium frames are objects of desire, the cycling equivalent of rare vinyl records. Though you can find off-the-peg titanium bikes, the now-trendy material has found its niche in the custom frame market. Boosting its reputation: the legendary difficulty of welding it, which must take place in inert conditions, since oxygen and nitrogen can damage the joint. Of course, it helps that titanium frames look cool. Unlike steel or carbon, the bare metal needs no coat of paint to protect it, and most owners would



WELD-LIKED Titanium craftsman Darren Crisp

majority of carbon frames from factories in China or Taiwan. For Colin Tanner, co-owner of Acme Bicycle Co. in Brooklyn, “the clean aesthetic of a titanium frame, handmade by an artist with a welding mask” adds a refreshingly romantic note to bike-making in an era of “lab-tested sterility.”

Darren Crisp is one such artist. A lanky, garrulous Texan who went to Italy in 1990 on an A&M University study program and returned to live, work and eventually start a family, Mr. Crisp has become a legendary frame-builder. This may have something to do with the fact that it’s irksomely difficult to get your hands on a Crisp.

His workshop lies in the outskirts of a tiny town called Castiglion Fiorentino, south of Arezzo. Inside, welding equipment, neatly sorted tools, and bikes in various states of

turn the front wheel smoothly) by leading manufacturer Chris King. The rest—wheels, saddle and other components—is not part of his remit, though he is happy to advise.

A year can pass between a client’s commissioning of a frame and delivery. With such a long waiting list, Mr. Crisp has the luxury of refusing clients he deems insufficiently on his wavelength. He tells one story of a wealthy customer whose initial approach was, “This is what needs to happen.” When Mr. Crisp told him his frame wasn’t happening, the client pleaded for two years, even driving from Milan without warning to shout at the workshop door, before the bike-builder finally relented and agreed to craft the frame—on condition that the client stopped calling and let Mr. Crisp do it his way.

One sure way to get off on the wrong foot with Mr. Crisp is to ask how much your dream bike might weigh. In a world where brands compete to make carbon frames under 700 grams (the equivalent of about 15 golf balls, or two cans of Campbell’s soup), Mr. Crisp’s comment that he’s “not here to compete with sub-1,000-gram frames” is titanium-cult code for “there’s more to cycling than going fast.” True titanium fans, he implied, are riders as much as racers—cyclists rather than gram-shaving “weight-weenies.”

Reflecting on clients who seek out his titanium designs after years of riding carbon-fiber, Mr. Crisp sounded a little like a Zen master: “You get to a certain point in life,” he said, “where you step out of the way everyone’s doing it, and you find your own path.” At least until the next big trend rolls along.

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never dream of hiding their frame’s satin-finished titanium tubes.

Titanium has a distinct downside—compared to carbon, it’s prohibitively expensive and difficult to work with—but that becomes a plus for aficionados. Titanium has become the last refuge of artisans in an industry dominated by international brands that source the vast

completion are framed against a classic Tuscan view of cypresses and olive groves through floor-to-ceiling windows. In this rustic-meets-high-tech space, Mr. Crisp makes just 40 titanium road- or gravel-bike frames a year. Starting at \$4,300 (crisptitanium.com), they include carbon-fiber forks and a headset (an element that lets you

TOTALLY TUBULAR

Three more titanium masters



Moots The Colorado-based firm has built titanium frames since 1991, offering stock designs and custom fits. The Routt RSL is its top-of-the-range gravel bike. From \$5,799, moots.com



Firefly For a range of technical innovations that include adaptive butting, custom dropouts and anodized finishes, Firefly designs its rigs to a client’s specifications. From \$4,400, fireflybicycles.com



Seven The double-buttressed Axiom SL is Seven’s best-selling road-bike frame, as well-suited to *Gran Fondo* racing as it is to long days in the saddle during *randonnées*. From \$4,299, sevencycles.com



A CLEAN GETAWAY AmazonGo ensures you don’t waste time fighting long lines and fidgety scanners.

Check Out a Quicker Checkout

Wallet-free shopping, souped-up grocery carts and robot helpers are making supermarket excursions smarter—and much, much faster

IT’S BEEN YEARS since technology began helping urbanites avoid the teeming aisles and whimsical “organization” of grocery stores. Despite the advent of FreshDirect and Instacart, however, I still make dreaded milk-and-juice runs now and then. The good news: A.I. is turning in-store experiences into equally seamless transactions—no lines or registers, no “chip malfunction,” no wait.

Take AmazonGo, the A.I.-powered convenience mart that opened 10 locations in cities including Seattle and Chicago last year, with plans to evangelize New Yorkers next. Cutting errand time back considerably, the store offers “JustWalkOut” shopping for groceries and meals. How it works: Download the free app, scan a QR code at the entrance, grab items off the shelves and exit through the turnstiles. By the time you receive a receipt in the AmazonGo app, you’re halfway to the car.

At less intelligent stores, you might soon be able to grab a cart that lets you checkout and bag items without a wait. That’s the promise of Caper, a smart shopping cart with a barcode scanner and card swiper built in, as well as mounted cameras that use image recognition and a weight sensor in the basket. The goal: to help Caper’s A.I. learn to be scanner-free.

But Caper—now available in a handful of N.Y. stores and rolling out nationwide in 2019—aims to enhance the entire shopping experience, not just the traffic jam before paying. “The pain point of checkout is universal, but checkout is the tip of the iceberg,” says CEO Lindon Gao.

The cart’s push-handle-mounted touch screen provides real-time recommendations as you stroll, ping-ponging you with sales and ideas for other items based on what you’ve tossed in the basket—as well as helping locate that odd can of diced jalapeños mysteriously missing from Aisle 9.

Some supermarkets have introduced bionic assistants onto their floors. Tally, the Simbe Robotics-powered bot that recently started roving around Schnuck’s stores in St. Louis, uses computer vision to autonomously inventory shelves and keep popular items like my vanilla creamer stocked. Fellow bot Marty, who alerts humans to spills and other hazards, is making its debut at more than 150 U.S. markets this year.

All of this might seem overwhelming to those who haven’t quite mastered self-checkout without spewing vulgarities. For others, these innovations promise far fewer headaches and much less time wandering Aisle 9. —Rachel Jacoby Zoldan