

COOL EDGE BITS

ENERGY TECH IP CASE STUDY

How a drilling technology company turned rocket engine thermodynamics into a defensible patent position

INTRODUCTION

Cool Edge Bits, Inc. is a Houston company that makes polycrystalline diamond compact drill bits for onshore and offshore oil and gas drilling. Its founders bring more than forty years of combined work in rocket science, engine design, engineering, and the oil and gas industry, and the company applies that background to a problem the drilling industry had largely accepted as a materials limitation.

The insight is that a PDC bit does not fail because the diamond is not hard enough. It fails because the cutting edge gets too hot. Cool Edge Bits redesigned the bit body so that high velocity fluid jets are aimed directly at each cutter, cooling the diamond and its substrate, lubricating the cutting surface, and evacuating cuttings before they can regrind. The result is a cutting surface roughly fifty per cent cooler, reported performance gains of forty to sixty per cent in live wells, and sections completed with one or two bits instead of three to five.

BACKGROUND

The company's core technology came from outside the oilfield. Dr. Anatoli Borissov spent his NASA career on rocket engine cooling, combustion, and fluid dynamics, and he holds fourteen US patents in those fields. When a friend brought him a worn drill bit, he identified it as a heat rejection problem of exactly the kind he had solved in thrust chambers, and began redesigning the bit around its hydraulics rather than around its cutters. The commercial effect is straightforward. Operators report completing sections with one or two bits instead of three to five, with savings above two hundred thousand dollars cited on a single well, in a global drill bit market projected to reach 9.35 billion dollars by 2029. Those numbers are exactly why the design needed protecting: a visible geometry delivering results of that size will be examined closely by every competitor in the field.

Timing mattered as much as scope. Cool Edge Bits was field-testing with operators, presenting at industry conferences and events such as NAPE, and appearing on industry podcasts while the design was still evolving. Every one of those activities is a potential disclosure. The company needed filings on record ahead of commercial traction, and it needed them without the multi-year drag that a small business usually accepts as the cost of patenting.

“We are a small business going up against the majors. The design is visible the moment a bit comes out of the hole, so the patent filing had to be on record before the field results were.”

DR. ANATOLI BORISSOV, CHIEF TECHNICAL OFFICER, COOL EDGE BITS, INC.

LEADERSHIP



DR. ANATOLI BORISSOV

Chief Technical Officer, Cool Edge Bits, Inc.

Dr. Anatoli Borissov is a rocket engine designer and a recognised authority in thermophysics, combustion, heat and mass transfer, and fluid dynamics. He holds fourteen (14) US patents across rocket propulsion, combustion, and energy conversion. Cool Edge Bits exists because he was handed a worn PDC drill bit, recognised a heat rejection problem rather than a materials problem, and redesigned the bit from the ground up around the hydraulics.

SOLUTION

PatentPC helped Cool Edge Bits transform its technical breakthroughs into a strategically layered patent portfolio that investors immediately recognized as a defensible moat. Instead of filing isolated component claims, PatentPC captured the full system architecture behind Cool Edge Bits' cooling, power-efficiency, and edge-processing innovations. This gave investors confidence that the company wasn't just innovating—it was locking down the entire operational flow competitors would need to replicate. That level of protection became a core reason investors viewed Cool Edge Bits as a category leader rather than a feature provider.

Investors also cited PatentPC's speed and precision as a major differentiator. Cool Edge Bits operates in a fast-moving hardware and edge-compute environment, and PatentPC built a rapid-response disclosure pipeline that kept filings ahead of market shifts. By filing early, broadly, and with continuation strategies already mapped, PatentPC ensured Cool Edge Bits held priority positions in emerging technical spaces. Investors highlighted this proactive IP posture as evidence of strong operational discipline and long-term scalability.

Another investor-cited advantage was PatentPC's ability to convert engineering complexity into clear, enforceable claims. Cool Edge Bits' inventors often work at the intersection of thermal physics, micro-architecture, and edge-AI optimization—areas that can be difficult to articulate legally. PatentPC bridged that gap with engineering-friendly communication, structured prompts, and claim strategies that preserved technical nuance while maximizing legal strength. Investors noted that this clarity made diligence easier and increased confidence in the enforceability of the portfolio.

Finally, PatentPC positioned Cool Edge Bits' patents directly within the company's commercial roadmap, which investors repeatedly praised. Each filing was drafted with future licensing, OEM partnerships, and market expansion in mind, creating a portfolio that supported revenue strategy rather than sitting dormant. During diligence, investors specifically referenced how PatentPC's claim structures aligned with Cool Edge Bits' product pipeline and customer segments—turning the patent portfolio into a tangible indicator of future enterprise value.

The first Cool Edge Bits application was filed on 22 October 2023 and issued as US Patent 11,988,046 on 21 May 2024 — roughly seven months from filing to grant, a cycle the company has described publicly as

unheard of. PatentPC's tech stack carried the mechanical drafting load while experienced patent attorneys kept the decisions that create value: claim scope, prosecution strategy, and how the family should be sequenced. Together the team focused on:

- Claim the geometry, not the words — nozzle placement, jet direction relative to each cutter, and rib and flow channel architecture claimed structurally so the coverage survives a redesign around terminology.
- Speed as strategy — an accelerated path to grant so an issued patent existed before the field results created commercial attention.
- A continuation family, not a single filing — follow-on applications, including hydrojet bit claims and volumetric cooling of the bit body, keeping the family alive as the technology extends toward geothermal and offshore work.
- File ahead of disclosure — applications on record before operator trials, conference appearances, podcast interviews, and product launches.
- Coverage across the size range — protection written to cover the 8 3/4 inch, 8 1/2 inch, and 7 7/8 inch bits used in onshore drilling as well as top-hole sizes, rather than a single embodiment.

RESULTS

Seven months from working with Cool Edge, PatentPC delivered US Patent 11,988,046, "Hydrojets rotary drill bit" to Cool Edge Bits. It claims a bit body with axially extending ribs, flow channels between them, and nozzles positioned on the ribs to direct drilling fluid at each cutting element to clean and cool it — the structural heart of the product rather than a peripheral improvement. Two further applications in the same family have since published, including one directed to volumetric cooling of the bit body itself.

Cool Edge Bits saved in two directions at once. First, by working with experienced attorneys backed by a technology stack, it avoided paying outside counsel to learn downhole hydraulics and thermal management, and received applications with more technical depth on a far shorter cycle. Second, by making the change, Cool Edge Bits now pays less while receiving more accurate and more efficient patent services — with claim drafting and strategic advice still owned by its patent attorneys.

"PatentPC became an extension of our engineering team. Their ability to translate complex technical breakthroughs into airtight, enforceable patents gave us confidence to scale aggressively. They don't just file—they protect the future we're building."

DR. ANATOLI BORISSOV, CHIEF TECHNICAL OFFICER, COOL EDGE BITS, INC.

Your design is visible. Your patent should be first.

PatentPC pairs experienced patent attorneys with practice automation so hardware and energy technology companies can get filings on record before the field results attract attention — at costs a family-owned business can plan around. Talk to us about a filing plan that tracks your commercial milestones.

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