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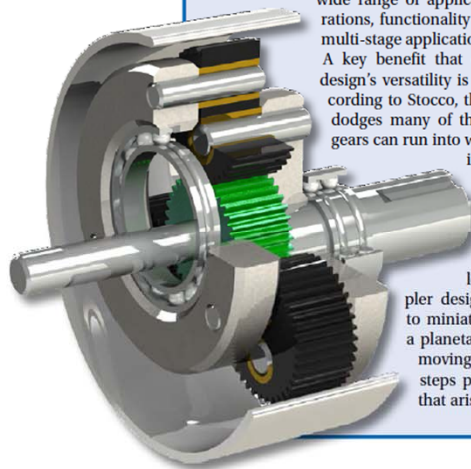
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Escaping Orbit: Orbitless Drives Develop New Alternative to Planetary Gearboxes

Though not directly involved with the purchasing of gearmotors, something your gearmotor manufacturer in turn might be looking at in the future is the Orbitless Drive, a new gearhead design being licensed by Orbitless Drives.

The Orbitless design is the brainchild of Leo Stocco, CTO of Orbitless Drives and robotics expert. The gearhead is a modified take on the standard planetary gearset. Namely, the design calls for removing the ring gear and replacing it with a second carrier attached to the planet gears with a second shaft.

The Orbitless gearhead is designed to be a general purpose tool with benefits across numerous industries from medical to aerospace to automotive and to work with all sizes of motors. As Orbitless Drives' CEO, Robert Eisses, put it, it's not designed to be a product. It's a platform.

"If you look at our customer base, they deal in multiple markets," Eisses said. "So anywhere from automotive to aeronautical to medical devices to industrial to consumer products; each of them have a different angle in terms of how they're addressing that market, whether it's cost or precision or whatever, and our technology applies to all of them to make their specific products in each of those markets better."

The laundry list of improvements over a standard planetary gearset is impressive: lower backlash, less friction, higher efficiency, lower pitch velocity, lower bearing velocity, relaxed assembly criteria, simpler construction, a wide range of applicable ratio configurations, functionality in both single and multi-stage applications and more.

A key benefit that contributes to the design's versatility is its resizability. According to Stocco, the Orbitless design dodges many of the issues planetary gears can run into when resizing, making it much easier to repurpose for different sized applications than planetary designs. The Orbitless gearhead's simpler design makes it easier to miniaturize compared to a planetary gearset, and removing the ring gear side-steps potential difficulties that arise from the need to

have such a large gear around the full set when the design is upscaled. And an additional option the Orbitless gear design supports over a planetary gearset is plastic gearing, particularly during resizing.

"The problem is when you make a ring [gear] small, it's very thin and it easily deforms," Stocco said. "Well when it deforms, the efficiency suffers dramatically. So if you make everything out of plastic, it's hard to maintain the efficiency in a planetary gear where you can make the case and everything of an Orbitless out of plastic because they only have pinions which don't deform so much."

But because of the similarity in design, while an Orbitless gearhead may be less complicated than a planetary, it carries many of the same fundamental design principles. Many of the advances the industry has made in planetary gearing also apply to the Orbitless design, and much of the expertise a manufacturer may have built up designing planetary gearsets is still applicable when working with this new gear design.

"Because the parts are fundamentally equivalent to what's been done for such a long time, you get to leverage all the advancements that have been made in tooth geometry and all the things that are being done in a planetary to make it more efficient," Stocco said. "Well you don't have to throw that away and start all over because it's not so far different. You can use most of those techniques."

In addition, the Orbitless gearhead design offers various benefits that would be appealing for different applications on both ends of the size spectrum.

According to Stocco, the Orbitless design is easy to manufacture, as well, requiring less expertise than a full planetary gearset.

"Anyone that is capable of manufacturing a planetary gear, it's actually easier...the technology behind internal gears is unnecessary and everything else you're already doing is all you need to do to implement it," Stocco said.

And the goal for Orbitless is to get others to implement it. Rather than selling their own gearheads to end customers to attach onto an individual motor, they're marketing them to gear and gearmotor manufacturers as a licensed component for the complete package before it goes to market. And to meet that end, the company has made sure their product is both simple and malleable in its implementation. The ways an Orbitless Drive can be utilized are as numerous and varied as the planetary design it's derived from, with each configuration having

its own strengths to shine in specific industries or applications.

Considering the newness of the design, Stocco also believes that there may be additional, unexplored configurations as well, but any new possibilities Orbitless technology could open are only just starting to be explored. The patent pending Orbitless Drive was conceived only a few years ago, and the company only started working with customers in the past year to validate its efficiency and other properties. Its exact place in the industry has yet to be seen, as does how widespread the technology will become.

But whether the Orbitless Drive becomes a mainstay addition to the gearmotor manufacturer's toolbox or a more specialized one, it remains a new and exciting tool in an industry that hasn't seen an attempted reinvention of the wheel in some time.

Eisses, however, believes that Orbitless Drives' design is in step with the times and will lend itself well to the ever-growing robotics and automation industries, which are always hungry for efficient, compact and portable designs, and the direction automotive is going around eMobility, which will require more efficient and quieter gears than ever. Stocco, who has a background in robotics himself, has also experienced more enthusiasm than he initially expected in the industry.

"The gear experts that we've been talking to have been surprisingly open-minded about accepting something that really changes the way that they potentially can operate," Stocco said. "Up until now, there's been two options that you compare between when you're deciding how to implement a gear, and now we're showing up with a third one. I was expecting more resistance than we've gotten from it. People were really quite excited to have a new tool in their toolbox in order to try to solve the problems that they get day to day."

And if that enthusiasm is anything to measure by, you might want to keep an eye on the Orbitless gearhead's progress in the industry—you may very well see it in a future gearmotor you purchase! **PTE**

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