



## **MICROVORTEX™ FILTER, THE “IMPOSSIBLE CLOTH”**

- **PATENTING MICROVORTEX™ CLOTH**
- **THE FIRST MICROMESH GUTTER GUARD  
TO EVER FEATURE LOUVERS**

On March 29, 2011, Edward “Alex” Higginbotham received Patent Number 7,913,458 from the US Patent and Trademark Office (“USPTO”).

The application for this patent was submitted in January 2007. Given the high volume of applications the patent office receives, it took until the end of March 2011 for the patent to be granted.

Mr. Higginbotham received 10 claims in this patent. This is his fifth patent issued by the US Patent Office; it joins two Canadian and one Australian patent. Since he’s always improving and inventing, Mr. Higginbotham has several other patents pending. In his patents, he has taught over 40 unique claims.

According to the USPTO, a patent is an intellectual property right granted by the Government of the United States of America to an inventor “to exclude others from making, using, offering for sale, or selling the invention throughout the United States or importing the invention into the United States” for a limited time in exchange for public disclosure of the invention when the patent is granted. This right was established over 200 years ago in Article 1, Section 8 of the United States Constitution: “To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”

All of Mr. Higginbotham’s patents are utility patents, in contrast to design or plant patents. Design patents may be granted to anyone who invents or discovers any new and useful process, machine, article of manufacture, or composition of matter, or any new and useful improvement thereof. The claims are the part of the patent that defines the scope of protection granted and are of the utmost importance should the patent ever need to be litigated. Therefore, a claim is most valuable when it has a minimal set of limitations on it that differentiate it over what came before it.

As mentioned, this patent consists of 10 claims. Several are dependent claims, relying on another claim in the patent itself. Like the genesis of all of Mr. Higginbotham’s teachings about what happens to a cloth touched on the underside by downward extending planes, this patent is the first ever issued for a micomesh gutter guard that consists of upward or downward louvers (or louvers in both directions) built into the underlying body of the product that touch the filtering element above.

To best describe what happens when this technology is employed, Mr. Higginbotham often points to what it's like being in a tent in the rain. The roof of the tent will shed the rainwater until you take your finger and touch the tent's roof. Then, you'll find water creates a new path—through the tent cloth and down your finger.

In combination with the claim of cloth touched by louvers, his fourth claim teaches what we at MasterShield have termed the Higginbotham Ratio, the optimum ratio of thread diameter to threads per inch that allows a cloth or screen to achieve nearly 100% water permeability regardless of how dense (in terms of threads per inch) the cloth might be. In theory, the Higginbotham Ratio teaches that a cloth with 10,000 threads per inch can be made water permeable, even though it looks like a solid surface to the naked eye.

For more than 100 years since the first patent was ever issued for a gutter guard in 1887, no one believed that the thread count in a gutter guard screening could go below 18 threads per inch. Higginbotham was the first to make the point in the first patent he submitted in 2001 that this was not the case. For years, examiners used the phrase “obvious to anyone skilled in the arts” to let Mr. Higginbotham know that it was apparent to anyone with a basic knowledge in the field that taking the holes smaller and using a higher thread count would keep out more debris. In fact, it's hard to believe now, but up until Mr. Higginbotham's patents were issued, “fine mesh” in gutter guards was actually defined as 18 threads per inch or less (fewer threads, more space between the threads).

But Mr. Higginbotham was primarily trying to teach about water. His previous patents granted use of a micromesh cloth, but prior to patent 7,913,458, examiners focused on his methodology for pulling the water through some form of housing that used a cloth. Eighteen threads per inch had constantly been referenced but never been challenged in the field of gutter covers because everyone with skills in the arts believed emphatically that water would fill the empty air space and overflow the screen (traditionally called sheeting); it would become a virtually solid surface causing the gutter guard to fail.

It took Mr. Higginbotham to challenge this long standing misconception. Through a back and forth dialog with his examiner during the application phase of this patent, Mr. Higginbotham continued to teach, referring to all the history that came before him, where everyone argued you couldn't go small, sticking to his guns that no one had ever taught thread technology like his. Mr. Higginbotham wasn't challenging the obviousness of the fact that a finer screen will keep out more debris. But, he taught, if you followed everyone else's conclusions, you'll also impede the flow of water through it *unless you actually discover something that improves the water permeability and self-cleaning properties*, which he had

done. In patent language, that's articulated reasoning with some rational underpinning, which effectively means that you'd naturally be drawn to the same conclusion that everyone else was with the existing, rational facts. Once you discovered something different that challenged conventional wisdom and obviousness like he had done with the water properties of his cloth, it should be recognized for its uniqueness.

For the first time in more than a decade of patent submissions and dozens of intermediate level objections from the best US Patent examiners (part of the process of them asking questions to create what can and cannot be in a claim), the examiner of this patent finally recognized what Mr. Higginbotham was trying to teach with this ratio and the claim was granted.

In the end, Mr. Higginbotham's examiner commented as follows: "...Moradin teaches a mesh screen over the eavestrough, but with a much larger mesh. While it may be obvious to make a mesh size smaller to prevent varying degree of materials from passing into the gutter...[Higginbotham's] claim... is almost a cloth-like material and much closer to a solid material than Morandin's mesh. Thus, for this reason the examiner does not believe there would be any proper motivation to one having ordinary skill in the art to use a mesh having such a small size without relying on hindsight."

Mr. Higginbotham had done it. He had finally gotten a patent officer to dig deep into the history and long standing misconceptions and make the leap to the uniqueness of his discovery. In layman's terms, the examiner states yes, it's obvious that taking the size of the holes down in the mesh will keep out more debris, but it would take a unique event to discover that a virtually solid cloth with the Higginbotham Ratio would take water through it better than a mesh that had visible open space in it. As a result, it can be protected by a claim in his patent.

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We believe Mr. Higginbotham's patent accomplishes some important things with its issuance. First, it gives the gutter guard industry its first reference point to define what micromesh or microfilter is: a filtering membrane made of any material (stainless steel, polymer, ceramic, aluminum, etc.) with no fewer than 80 threads per inch. Products with fewer threads than 80 per inch should be classified as fine mesh screening, not micro mesh. The patent also defines a maximum hole size for a microfilter – no bigger than 100 microns. This means that expanded metal or products with punched or perforated holes shouldn't be

considered microfilters, their open air diameters are much too big, and not defined in microns.

Homeowners, architects, builders and remodelers can rest assured that when they install a gutter guard that features MicroVortex™ cloth they are getting state-of-the-art, patented Higginbotham technology that meets the parameters of what should be defined as microfiltration and the Higginbotham ratio. Currently, only MasterShield features the MicroVortex™ membrane. This, combined with our HydroVortex™ technology, makes MasterShield the most advanced gutter guard available on the market today.

MasterShield: the Gold Standard of Gutter Protection.