NAVIGATING SILENCE

PATENT INNOVATIONS IN UNDERWATER NOISE REDUCTION FOR SHIPS

(2013-2023)

INTRODUCTION

Our oceans are increasingly besieged by an array of disruptive noises. Daily, the cacophony from ships, underwater construction, and other human activities drowns out the natural symphony of the sea, posing a critical threat to marine life. Whales, dolphins, and fish rely on subtle underwater sounds to find food, mates, and navigate their environments. As these noises intensify, the survival of these species becomes perilously at risk.

In celebration of **World Intellectual Property Day 2024**, which emphasizes "IP and the SDGs: Building our common future with innovation and creativity," this report delves into innovative technologies specifically designed to reduce noise emissions from ships. We explore a range of recent patents that offer promising solutions for a quieter ocean, thereby contributing to the health and sustainability of marine ecosystems.

This report goes beyond merely cataloguing new inventions; it presents a vision of how these emerging technologies could foster quieter, more sustainable marine environments. The urgent need for such innovations is underscored by the rapid increase in underwater noise, particularly from maritime vessels. By addressing this critical issue through the lens of innovative intellectual property, we demonstrate our commitment to sustainable development and directly contribute to achieving Sustainable Development Goal 14: Life Below Water. This goal focuses on sustainably managing and safeguarding marine and coastal ecosystems to mitigate significant adverse impacts.

By developing and implementing these sound-reducing technologies, we not only aid marine life but also support a broader objective: cultivating a healthier ocean and a healthier planet. This endeavour aligns perfectly with the spirit of World IP Day, showcasing how intellectual property can drive solutions that forge a sustainable future for all.

THE OVERALL TRENDS IN PATENT FILINGS

In our endeavour to uncover the latest advancements in maritime noise reduction technologies, we employed a detailed and methodical approach to our patent search. Below is a clear breakdown of how we conducted this search:

What We Searched For:
Our focus was on technologies that mitigate underwater noise emissions specifically from ships, boats, yachts, and other types of vessels.

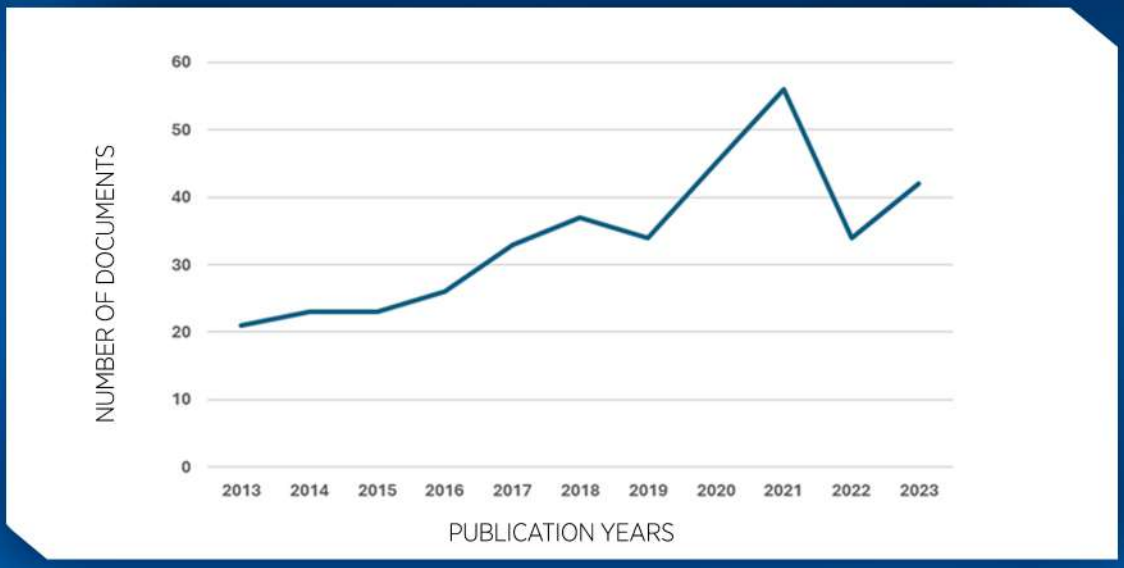
Keywords:
We crafted our search using a broad set of terms to capture all relevant technologies. Keywords such as "noise," "sound," "acoustic," and "vibration" were combined with verbs like "reduce," "absorb," "attenuate," and "isolate." This ensured we captured patents addressing different aspects of noise reduction. Additionally, we included terms like "environmental," "ecofriendly," and "pollution" to focus on solutions that have positive ecological impacts.

Time Frame:
The patents were filtered to include only those published between 2013 and 2023, ensuring our research incorporated the most contemporary and innovative solutions available.

IPC (International Patent Classification):
We specifically targeted patents classified under "B63," which is dedicated to ships and other waterborne vessels. This classification was critical in ensuring that our search was concentrated on technologies directly applicable to maritime vessels, thereby focusing on noise reduction solutions that are specifically designed for and implemented in ship and vessel operations.

THE OVERALL TRENDS IN PATENT FILINGS

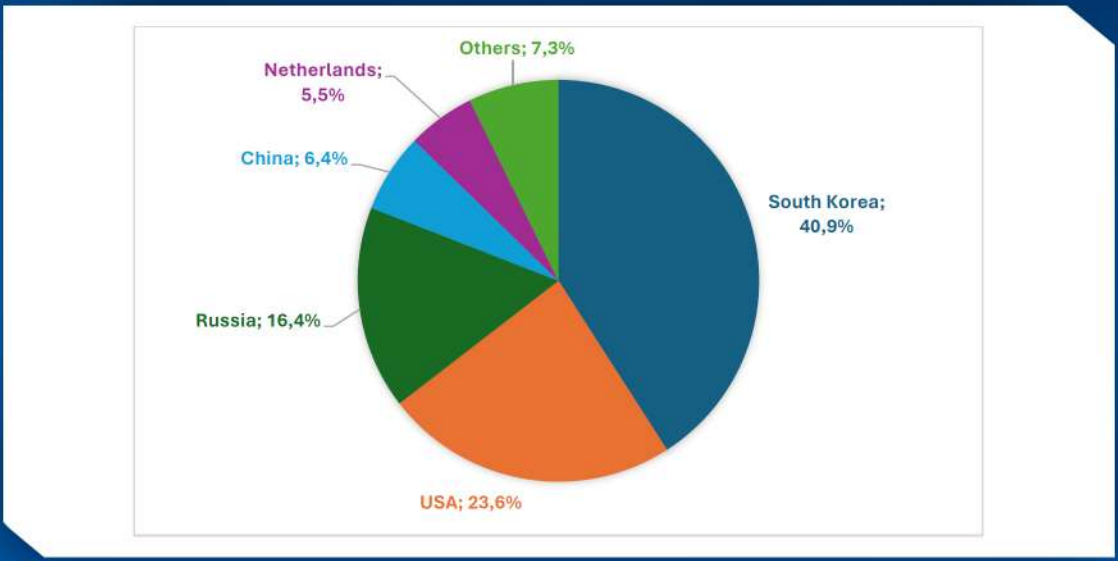
Patent Publication Trends in Marine Noise Reduction



Charting the course of innovation, our search reveals an ocean of ideas flowing in to quiet the seas. The data crests in 2021 with a notable surge of 56 patents, signalling a tide of commitment to silencing ship noise. This momentum in maritime acoustic advancements is far from ebbing, as demonstrated by a strong showing of 42 new concepts in 2023.

THE OVERALL TRENDS IN PATENT FILINGS

Global Harmonies in Marine Innovation



Steering through the data, South Korea emerges at the helm with nearly 41% of environmentally conscious patents aimed at hushing the sounds of the sea. The USA navigates a steady wake with about 24%, while Russia charts 16.4%, contributing to a quieter underwater world. Innovators from China, the Netherlands, and other pioneering nations contribute to the rest, crafting a global tapestry of solutions for sustainable seas.

After looking at the overall trends in patent filings, we'll now take a closer look at specific inventions. The next section of our report dives into detailed analyses of selected patents. We'll explore how these recent innovations work and why they might be game-changers in reducing ship noise and helping marine life.

KR20220047011A
Ship with a Noise Decrease Propeller Assembly

Overview: This patent, filed by Samsung Heavy Industries, introduces a ship designed with a noise-reducing propeller. The innovative propeller is engineered to lower the sounds that are typically produced underwater by the ship's operation, addressing the problem of cavitation—a common phenomenon where bubble formation can lead to loud and potentially harmful noise levels for marine life.

KEY FEATURES:

Propeller with Engineered Roughness: The propeller blades have a specialized area at the tips with increased surface roughness. This design feature is strategic in mitigating the cavitation at the source, effectively reducing the generated noise.

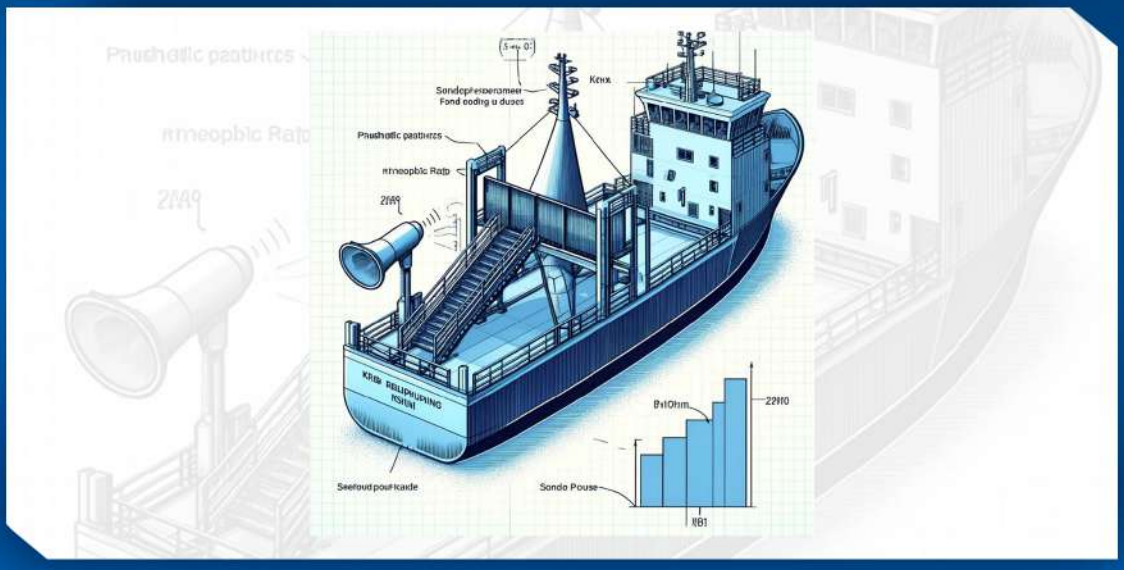
Dynamic Texture Modification: This is achieved through an array of elastic tubes embedded within the blade tips. These tubes can inflate, altering the surface texture in response to controlled air pressure, thereby adjusting the noise dampening as needed.

Controlled Air Supply Mechanism: The system has an intricate network of air supply that involves multiple housings and passageways, ensuring precise delivery of air to the tubes. This mechanism is fine-tuned to respond to various operational demands, allowing for real-time adjustments to the blade surface texture.

Significance: The significance of this patent lies in its potential to make maritime travel less disruptive to the oceanic ecosystem. The technology's ability to reduce noise pollution not only has environmental benefits but also represents a significant innovation in naval engineering. By creating a quieter operational profile for ships, this propeller design could set a new standard for eco-conscious maritime transport.

KR20210050842A
Apparatus for Reducing Marine Environment Noise Using Handrail

Overview: This patent describes an innovative device designed to reduce environmental noise on ships. It utilizes a handrail system equipped with a soundproofing mechanism, strategically positioned around noise sources on the ship.



KEY FEATURES:

Soundproofing Mechanism: Integrated into the handrail, this mechanism features a deployable soundproof member that can be moved up and down along the handrail. This design allows for flexible adjustment depending on the noise level and the ship's operational requirements.

Movable Means: The device includes a component that enables the soundproof member to be adjusted vertically along the handrail. This allows for optimal placement for noise reduction.

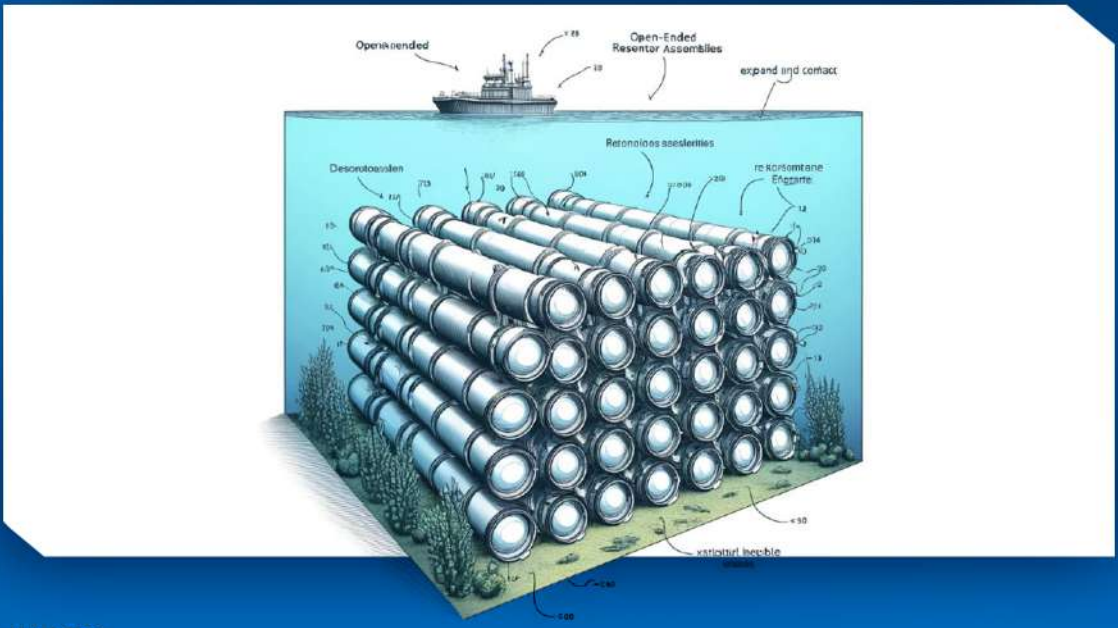
Telescopic and Folding Design: Part of the handrail and the soundproof member are designed to be telescopic and include folding parts, making them compact and easy to store when not in use.

Pneumatic Expansion: A pneumatic device can be connected to expand the soundproof member, enhancing its effectiveness in blocking noise.

Significance: This apparatus is significant for its potential to meet stringent environmental noise regulations while maintaining comfort onboard ships. By embedding the soundproofing within the handrail system, the invention offers a practical, space-saving solution that can be easily adapted to different ships. This device could set new standards in maritime noise control, enhancing environmental protection and operational comfort simultaneously.

US2015170631A1
Underwater Noise Reduction System Using Open-Ended Resonator Assembly and Deployment Apparatus

Overview: This patent introduces a unique underwater noise abatement system that employs open-ended resonators, like Helmholtz resonators, to absorb noise in marine environments. The system is designed to be deployed from ships or barges and can be conveniently stored when not in use.



KEY FEATURES:

Open-Ended Resonators: Utilizes specially designed resonators that can expand and contract. These resonators can retain a gas that aids in their function when submerged, absorbing sound effectively.

Expandable and Articulated Design: Features a hollow body with sidewalls that are expandable from a folded to an unfolded position, allowing for compact storage and easy deployment.

Stackable Configuration: Includes multiple resonator units that can be stacked together. This design not only saves space but also enhances the system's noise-damping capabilities when deployed around a noisy environment.

Dynamic Adjustment: The resonators have variable lengths and are equipped with a system that allows them to adjust resonance frequencies, providing flexibility to handle different noise frequencies effectively.

Significance: This resonator system is significant due to its innovative approach to mitigating underwater noise, which is crucial for protecting marine life from the disruptive effects of industrial noise. Its modular and adjustable nature makes it highly versatile and suitable for various maritime operations, providing an effective solution to meet stringent environmental noise regulations.

KEY POINTS

Innovative Noise Reduction: The patents we've explored, including the use of noise-reducing propeller assemblies and open-ended resonator systems, demonstrate groundbreaking approaches to mitigating underwater noise—a critical environmental concern.

Technological Advancements: These systems not only address the acoustic disturbances caused by ships but also present scalable and adaptable solutions that can be integrated into existing maritime operations.

Environmental Impact: By reducing underwater noise, these technologies play a vital role in preserving marine habitats and ensuring the wellbeing of aquatic life, aligning with global environmental protection goals.

CONCLUSION

This report underscores the pivotal role of intellectual property in fostering innovations that contribute significantly to sustainable maritime technologies. **As we celebrate World IP Day**, we recognize these contributions as integral to our ongoing efforts to build a more sustainable, quieter, and environmentally friendly future for our oceans. The continuous advancements in marine acoustic technology highlighted in this report exemplify the commitment of the global maritime industry to ecological stewardship and operational excellence.

Today, as we celebrate World Intellectual Property Day, we at Entertech Istanbul Technopolis are proud to recognize and honour the creative spirits and innovative minds that continue to push the boundaries of technology and science. Intellectual Property is not just a legal right; it is the lifeblood of innovation, fostering growth and inspiring solutions to some of our most pressing global challenges. This year, we highlight the significant strides made in marine technology to protect our oceans—a testament to the power of intellectual property in driving sustainable development. We extend our gratitude to all innovators and creators whose visions have shaped a better, more sustainable world. Let's continue to innovate, protect, and inspire.

Happy World IP Day!

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