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Research Progress on Marine Wall-Climbing Robotic Platforms (Postprint)

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Abstract

Ship wall-climbing robots differ from terrestrial robots in that they possess both locomotion and adhesion capabilities, enabling them to perform climbing movements on inclined ship hull surfaces. By equipping devices such as high-pressure water jets, welding guns, and image recognition systems required for rust removal, cleaning, and welding tasks, they complete corresponding operational assignments, with each task demanding different mechanical structures and operating modes. This paper introduces wall-climbing robots and their platforms designed and manufactured in recent years, and classifies them into design approaches including magnetic adhesion, negative pressure adhesion, and bio-inspired wall-climbing platforms based on their adhesion principles and locomotion characteristics. It presents the mechanical structure design, locomotion performance, and application scope of each platform type, aiming to provide inspiration for the design, manufacturing, and technological development of future marine robots.

Full Text

Preamble

The original text for this section is corrupted and cannot be reliably translated. All mathematical content and references are preserved in their original form as instructed.

Figures

Source: ChinaXiv — Machine translation. Verify with original.

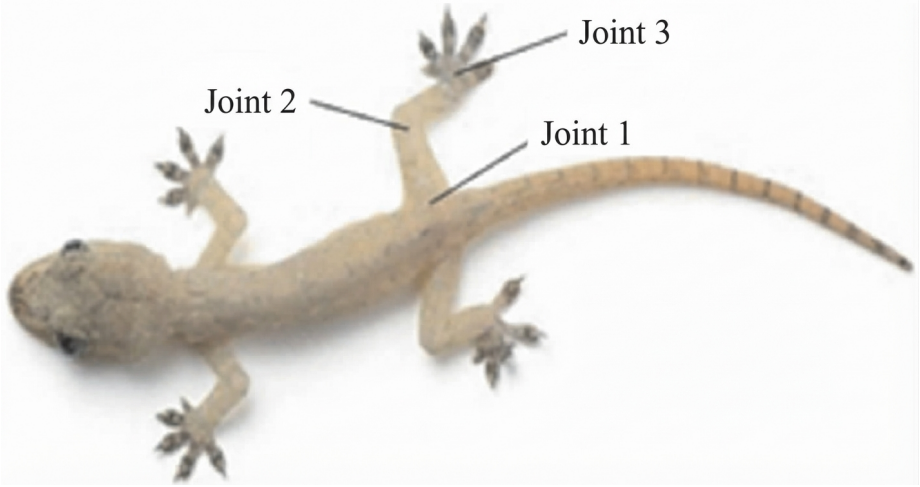

Figure 1: Figure 12

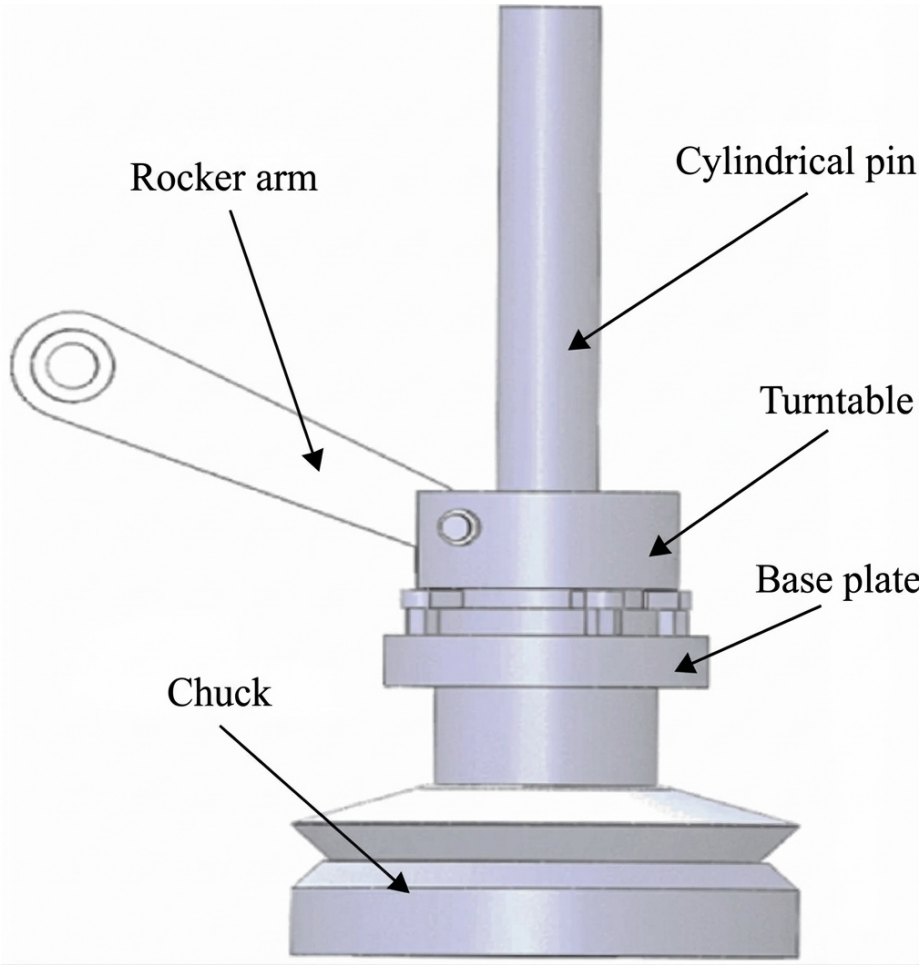

Figure 2: Figure 15