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# PATENT INVALIDATION

# PRISMATIC LITHIUM-ION BATTERY

## CASE STUDY

## Introduction to patent in question

The patent under scrutiny claimed a dual-gasket configuration in the negative electrode of a prismatic lithium-ion battery, with a unique design where the positive electrode was in conductive contact with the prismatic cell body. Additionally, the patent asserted that both the cell body and the lid were positively polarized, creating a novel electrical configuration aimed at improving sealing integrity, preventing electrolyte leakage, and enhancing thermal stability. The patent holder argued that this combination of features represented a significant advancement over existing prismatic cell technologies.

Our objective was to invalidate the patent by identifying prior art that either directly disclosed these features or suggested them through a combination of references, thereby challenging its novelty and non-obviousness.

## Proving Lack of Novelty

The patent's novelty hinged on three key features:

| | |
|---|---|
| The dual-gasket configuration in the negative electrode. | The cell body and lid are positively polarized. |
| The positive electrode is in conductive contact with the prismatic cell body. | |

To invalidate the patent, we needed to demonstrate that these features were either already disclosed in prior art or could be derived from a combination of existing technologies.

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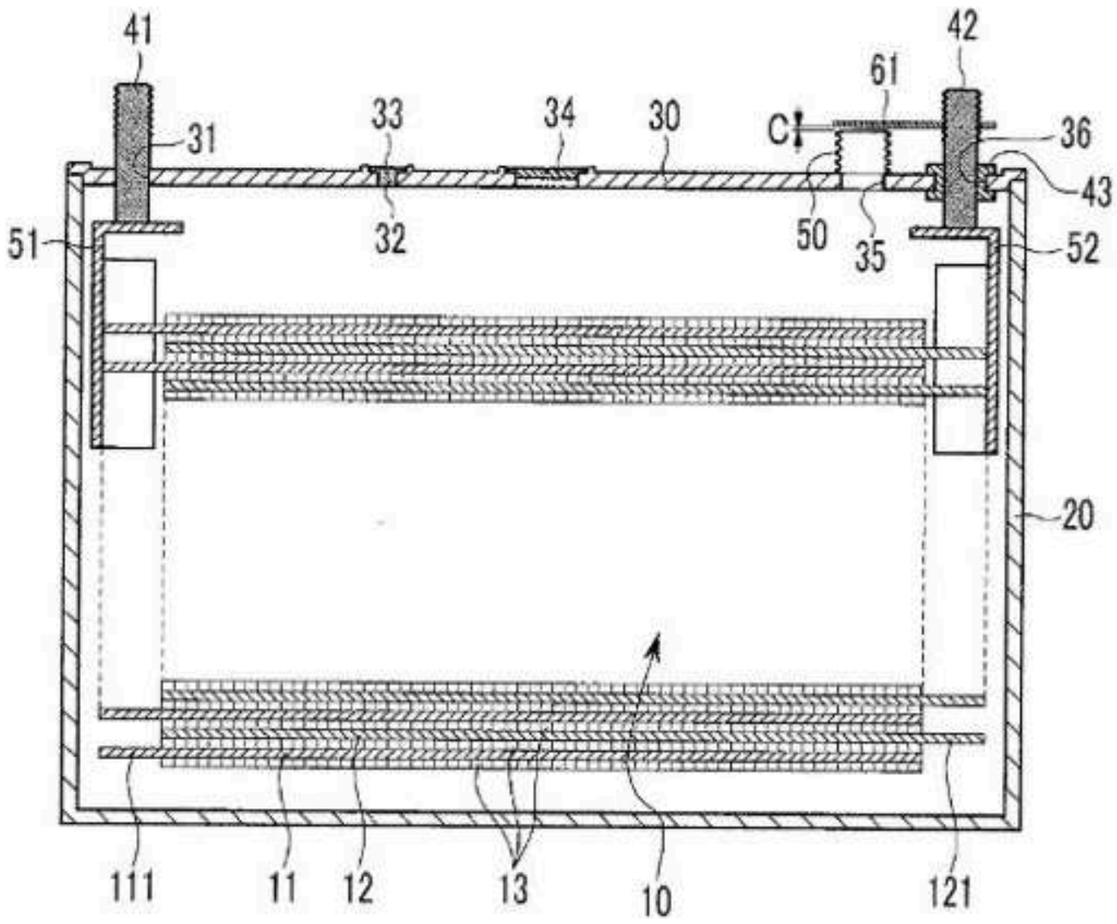
# Initial Search Strategy

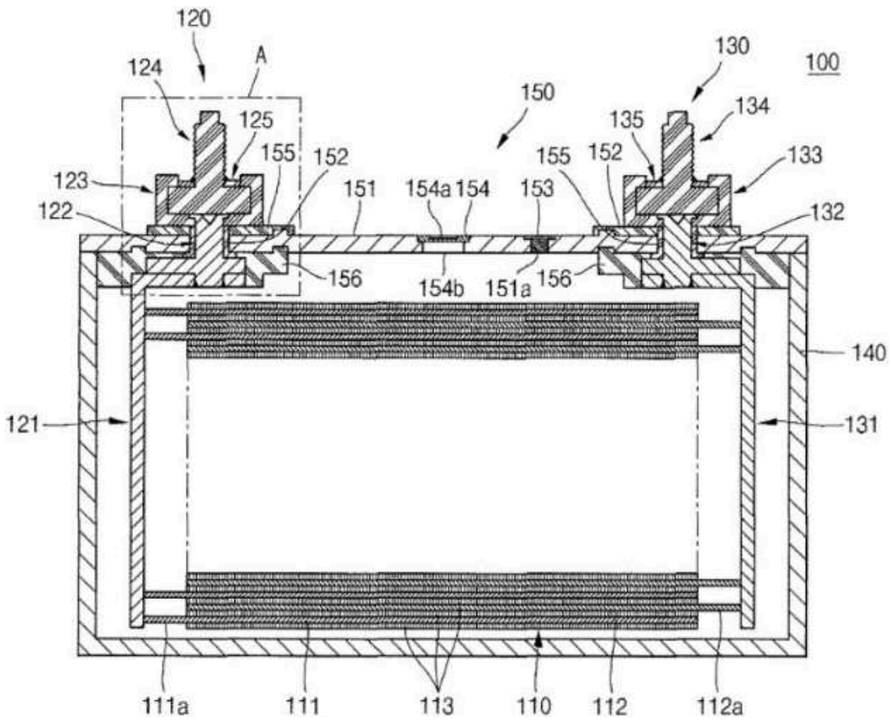
Initial searches using keywords like “prismatic cell”, “dual gasket”, “positive electrode conductive contact”, and “positive polarization” yielded limited results. Most patents focused on single-gasket architectures or unrelated sealing mechanisms, such as adhesives. However, the search hinted at potential prior art in US patents and non-patent literature that could be combined to challenge novelty.

# Invalidation Search Challenges

**Gasket not on top & lower positions:** Some designs included gaskets on either on the upper section or lower section, but not both, missing the dual-gasket arrangement.




**Both gaskets on both positions:** Many references included prior art with both gaskets on both positions on both terminals, whereas we only required both gaskets to be on both positions at the negative terminal.




**Body not in contact with the positive electrode:** Some designs included gaskets on either on the upper section or lower section, but not both, missing the dual-gasket arrangement.

# Refined Search Strategy

After our initial search yielded unsatisfactory results, our team brainstormed ways to improve. We refined the search process with the following steps:

1. Expanded Terminology
2. IPC/CPC Code Integration
3. Combining Keywords and Classes:
4. Global Prior Art
5. Assignee Analysis
6. Inventor Analysis
7. Combination Analysis

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- **Expanded Terminology**: Broadened terms to include “stacked seals,” “multi-layer insulation,” “electrode-body contact,” and “polarized cell housing” to capture alternative phrasing.

- **IPC/CPC Code Integration:** Prioritized codes like H01M50/147 (sealing members), H01M50/463 (electrode insulation), and H01M50/531 (electrode connections) to target technical specifics.

- **Combining Keywords and Classes:** Used terms like “dual-gasket battery,” “positive electrode conductive contact,” and “positively polarized cell body” alongside classification codes like H01M 2/08 (gaskets) & H01M 2/02 (cell casings).

- **Global Prior Art:** Included patents and applications from Japan, South Korea, and China to uncover region-specific innovations.

- **Assignee Analysis:** Focused on patents filed by leading battery manufacturers (e.g., Panasonic, LG Energy Solution) to identify advanced sealing and polarization technologies.

- **Inventor Analysis:** Investigated prolific inventors in battery sealing and electrode design, particularly those with expertise in prismatic cell architectures. Traced their patent portfolios and publications to uncover overlooked references, including prototypes or experimental designs.

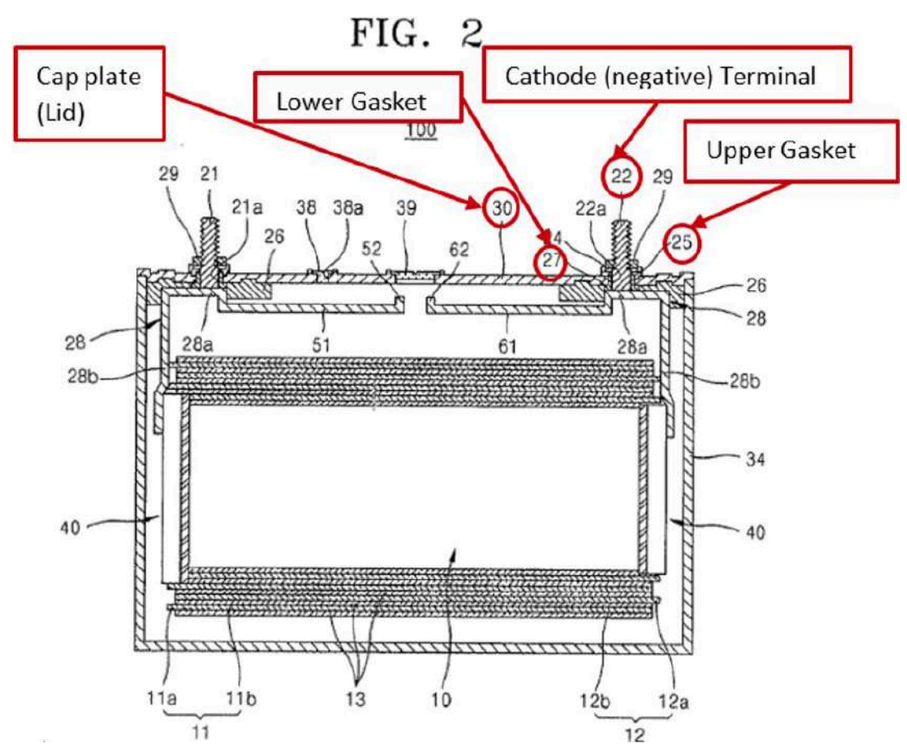
- **Combination Analysis:** Evaluated how disparate prior art references could collectively disclose the dual-gasket configuration, positive electrode contact, and positive polarization.

# Breakthrough Findings

The refined search uncovered critical prior art that, when combined, disclosed all features of the patented invention:

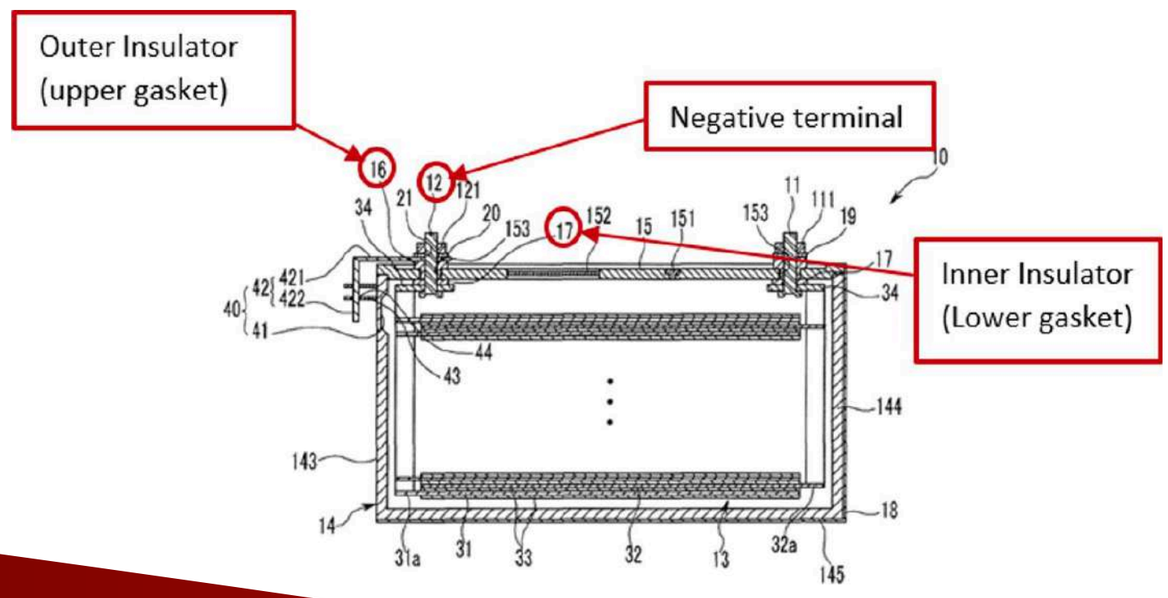
## Prior Art 1:

A US patent described an upper gasket and a lower gasket in prismatic cells to address electrolyte leakage. The reference also mentioned that the prismatic container was also positively polarized.




## Prior Art 2:

A US patent detailed the use of lower and upper gaskets at the negative terminal to electrically isolate the terminal. However, it does not disclose the polarity of the prismatic container.

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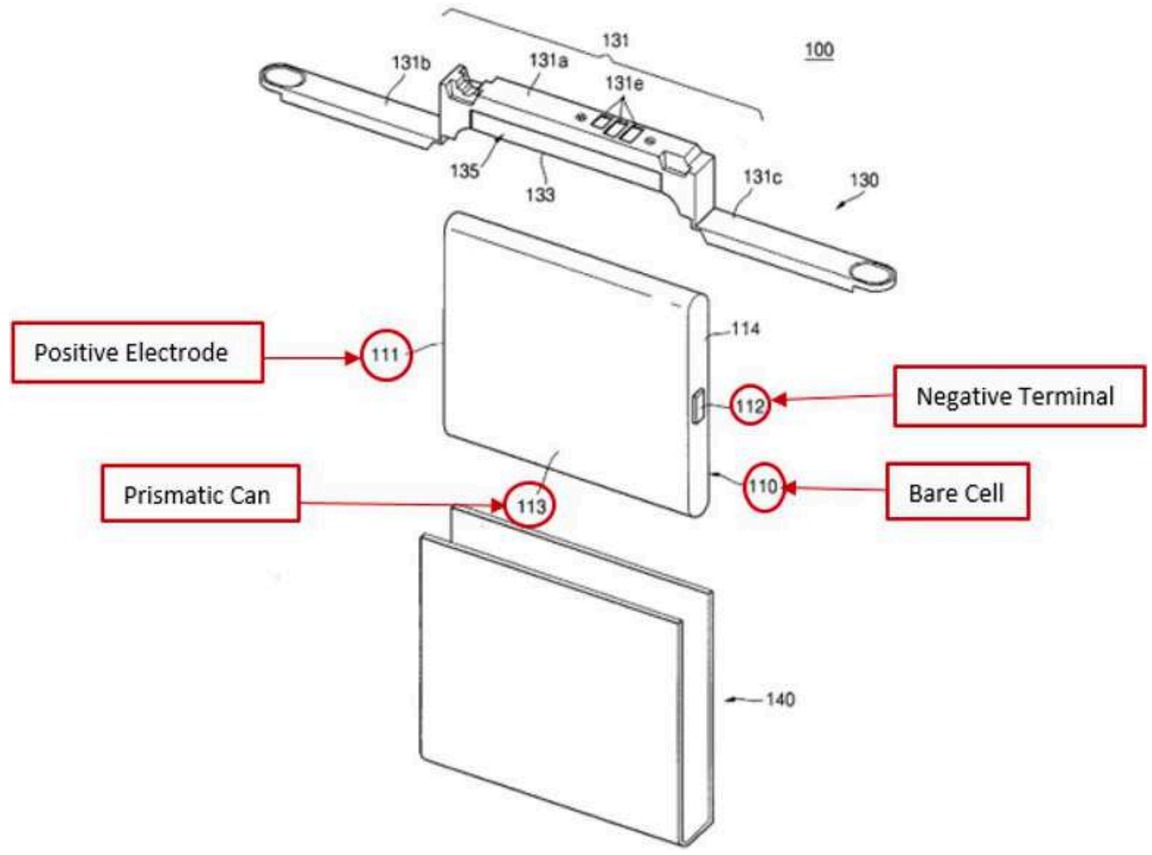
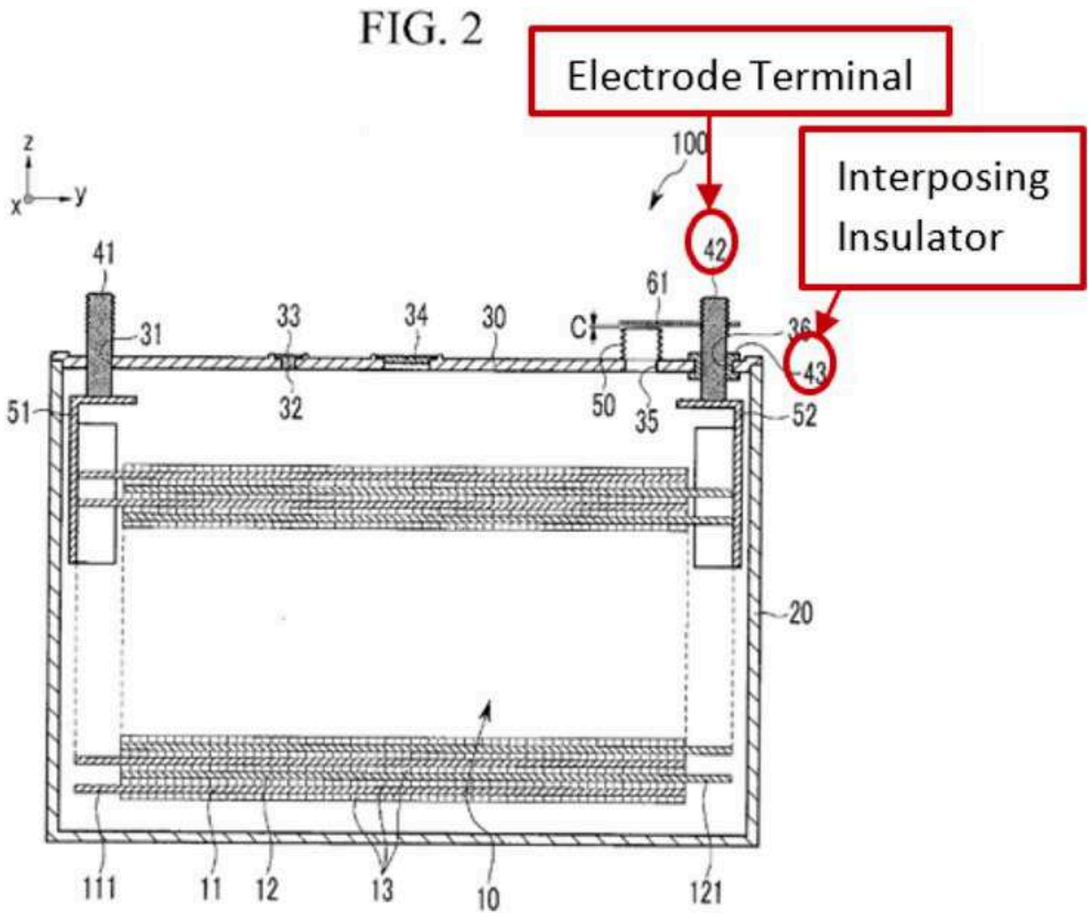
## Prior Art 3:

A US patent application reference discloses that the second terminal (negative electrode) is insulated from the cap plate to maintain proper voltage and electrical isolation with the help of an insulator(gasket). The case, made of conductive metal and connected to the positive electrode, is positively polarized. However, the reference does not disclose the plurality of cells and the materials used in the positive and negative electrodes.




## Prior Art 4:

This reference discloses a bare cell that is located in the prismatic can which is sealed from the open end with the help of a cap assembly. It consists of a positive electrode, which is electrically connected to the can. It further has a negative terminal of the electrode assembly, which is insulated from the cap assembly and the prismatic can with the help of an insulating gasket. However, it doesn't explicitly disclose anything about a separate top gasket and a bottom gasket that insulates the negative terminal from the lid cap.

# Outcome and Impact

- **Novelty Invalidated:** References and the combination of references demonstrated that the dual-gasket configuration was not novel.

- **Inventor Credibility:** The inventor's prior work established that dual-gasket configurations were an obvious extension of existing solutions, weakening the patent's "non-obviousness" argument.

# Conclusion

This case demonstrates the power of a multifaceted patent search strategy in challenging the validity of a patent. By integrating inventor analysis, global prior art, and technical expertise, we revealed that the dual-gasket configuration and the conductive touch were not novel but an obvious extension/combination of existing technologies. Such efforts ensure that patents genuinely advance innovation rather than stifle competition, fostering a dynamic and competitive technological landscape.

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