

## MODULAR SHELTER CONSTRUCTION SYSTEM

Main Technological Area —> Mechanics

Keyword —> Shelter

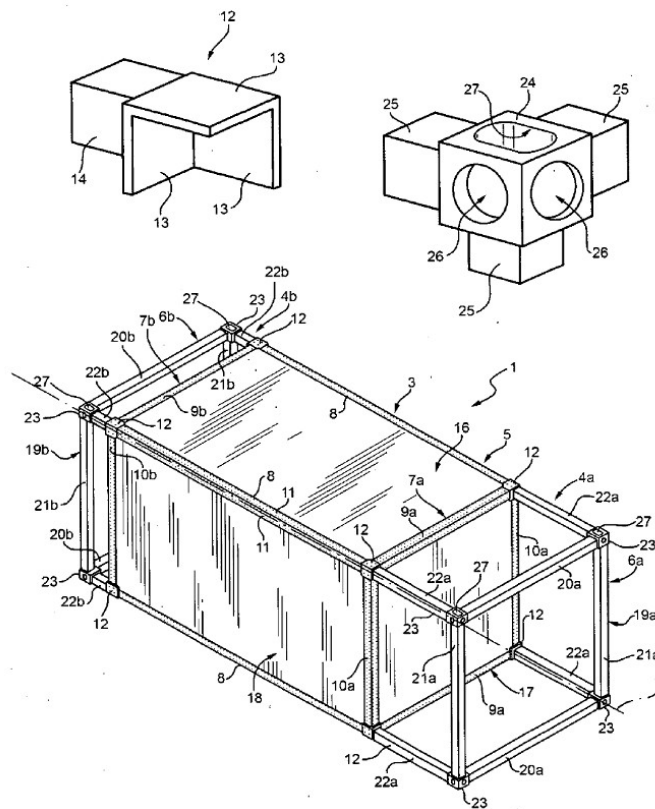
A shelter is a prefabricated unit commonly used for residential and/or operational use (e.g. healthcare unit, or operational centres) having the special feature of being temporary and transportable.

The shelters known to date suffer from some drawbacks due mainly to the fact that their frame, extended to the entire length is necessarily made of tubular profiles that are heavy and expensive in themselves because the standard corner blocks they are supplied with only match profiles of this type.

Furthermore, since the dimensions of a shelter are preferably in accordance with the ISO container standards (ISO1161 and ISO668), in order to satisfy demand, it is necessary to provide for a relatively high number of different side panels, generally equipped panels, of different longitudinal dimensions.

The solution identified by the patent has the purpose of indicating how it is possible to create a shelter in which it is possible to limit both the use of tubular profiles and the number and type of side panels to be used to meet market demand.

The result is an economic production process depending on the variety of primary elements available (profiles, corner blocks, variously configured types of walls) that can be standardized with a significant reduction of costs and reduced production times having to substantially assemble primary items of stock.



**TECHNICAL FEATURES**

From a structural point of view, a shelter is usually similar to a container and includes a parallelepiped frame formed by sections, which are rigidly connected to each other by means of standard type corner blocks, that allow the handling and locking to transport platforms. Panels are welded to the frame and possibly equipped with doors and/or windows that form sides of the shelter, defining a closed space, which is normally further subdivided by internal walls into a living rooms and in one or more technical rooms suitable for housing, for example, of service apparatuses such as generators, air conditioning systems, work equipments, etc.

In the traditional embodiment, the shelters are constituted by a monolithic structure which is not so highly flexible in case of need to change the longitudinal dimensions, the distribution of the internal spaces and theirs functionality, as this usually leads to having to prepare ad hoc parts with a low level of replicability.

Leonardo's solution is instead oriented to implement a modular structure which enables to :

- simplify and considerably lighten the frame structure with the use of L-shaped bars;
- change the position of the body along the shelter in a relatively wide range according to new requirements, simply by varying the length of the longitudinal tubes;
- considerably reduce setup times and costs compared to traditional shelters (welding may not be foreseen), offering at the same time a remarkably flexible and adaptable solution to each application requirement;
- meet market needs with a minimum number of basic "off-the-shelf" structural parts.

In other words, the "modular structure" of the shelter allows to reach, simply by varying the length of the longitudinal components and adapting the dimensions of the panels, an overall size in accordance with the ISO 668 standard or, in any case, any overall size within the minimum and maximum limits established by regulations, with obvious advantages in terms of simplification and standardization of structure design.

**INNOVATION/BENEFITS**

- *Reduction in the number of tubular sections*
- *Reduction in the number of side panels*
- *Reduced installation time and costs*
- *Increased stability*
- *Design Simplification*
- *Compliance with ISO standards.*

**AREAS OF USE**

<b>Logistics/Emergency</b>	<i>Mobile surgery rooms, Homeland Protection, containers for logistics services, accommodation and auxiliary services, etc.).</i>
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PATENT INFORMATION

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**Active Worldwide Extensions**

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**Leonardo internal code**

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**Leonardo References**

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