

Design of a Rapid Installation Structure for Prefabricated Modular Cabin

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Abstract: This paper introduces a design of a rapid installation structure of prefabricated modular cabin, which can achieve the purpose of rapid installation of prefabricated modular cabin, also effectively reduce the difficulty of the installation and effectively improve the installation efficiency. The prefabricated modular cabins installed by rapid installation has good wind resistance performance, it can prevent being blown down by strong wind during the installation, also could be disassembled when necessary after the installation.

Keywords: Prefabricated Modular Cabins; Quick Installation; Installation Unit; Accommodation Design

The traditional shipbuilding industry has features like long accommodation fitting period, serious material waste and low fitting efficiency. The prefabricated modular cabin unit technology can solve the above problems, moreover, it can greatly shorten the outfitting period of ship quay and reduce the waste of resources in ship building.

The installation structure of prefabricated modular cabin in the existing technology can not achieve the purpose of rapid installation, which makes installation difficult and low efficiency; also it has poor wind resistance performance, which makes the cabins easy to be blown down by the strong wind in the process of installing, and it is impossible to be disassembled after the installation.

1. Design scheme

In order to solve the existing problems, a rapid structure installation of prefabricated modular cabin was designed, includes a number of rapid installation units located at the bottom of the prefabricated modular cabin, each rapid installation unit consists of one base, one post and four sets of locking components. There is a fixed seat under the button of the base, the mounting groove in the upper center of the base. There are four mounting groove and four Straight Slot arranged on the side of the base symmetrically, and the fitting groove and Straight Slot located on the same side of the base are connected to each other. The upper end of the post is fixed to the bottom of the prefabricated modular cabin, the bottom of the post is inserted inside the mounting groove, and the side of the post is also provided with the ring groove, which is adjacent to the bottom of the post.

Each set of locking component consist of the mounting plate, teh fitting seat, the fixture block and the first spring. The mounting plate is bolted to the interior of the fitting groove, the mounting seat is fixed on the side of the mounting plate towards the mounting groove and in the straight slot, the first fitting hole is arranged in the middle of one side of the mounting plate forwards the back of the mounting seat, the sliding fixture block is mounted inside the straight slot, one end of the fixture

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block is stuck into the interior of the ring groove, the other end of the fixture block is provided with the second fitting hole in the middle, the first spring is fixed between the second fitting hole and the first fitting hole.

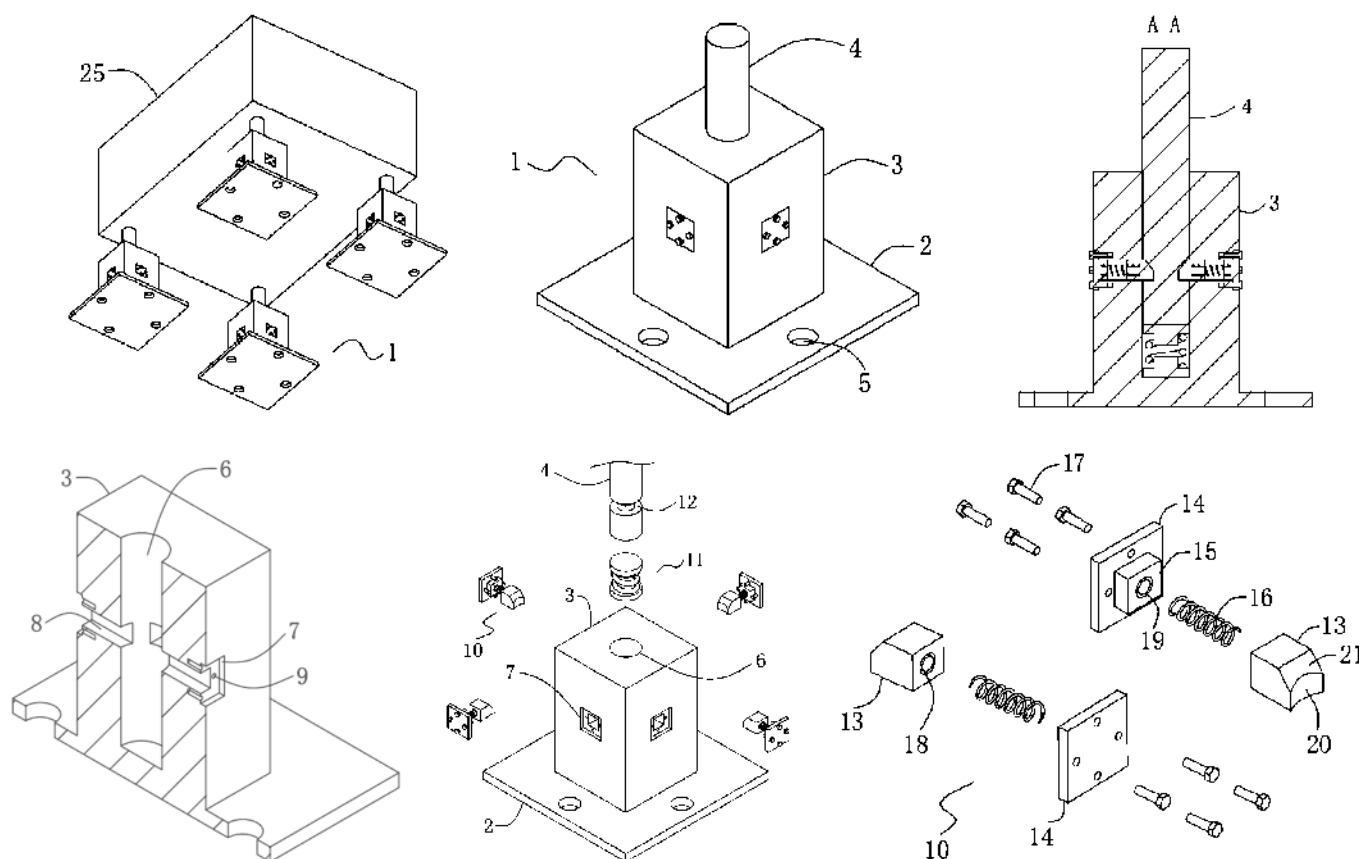


Figure 1. locking component.

In the figure: 1. Rapid installation unit; 2. Fitting seat; 3. Base; 4. Post; 5. Fitting hole; 6. Mounting groove; 7. Fitting groove; 8. Straight Slot; 9. Threaded hole; 10. Locking component; 11. Tight component; 12. ring groove; 13. fixture block; 14. Mounting plate; 15. Mounting seat; 16. The first ring; 17. Bolt; 18. The second fitting hole; 19. The first fitting hole; 20. Cambered surface; 21. The first cant; 22. The first spring seat; 23. The second spring seat; 24. The second spring; 25. Prefabricated modular cabin.

2. Working principle

Each rapid installation unit(1) consists of fitting seat(2), base(3), post(4) and four set of locking components(10), that makes the mass produce possible, and then assemble the fitting seat(2), the base(3) and the locking components(10) first, after that fit the post(4) at the bottom of the prefabricated modular cabin(25) vertically, in this way, the prefabricated modular cabin(25) can be rapidly installed on the ship, it simply insert the bottom end of the post(4) into the interior of the mounting groove(6) when fitting the cabin, under the action of gravity of the cabin, the end of the fixture block(13) will be stuck into the inside of the ring groove(12), that makes the fixing of the post(4) and the purpose of rapid installation of prefabricated modular cabin(25).

The locking component(10) consist of mounting plate(14), mounting seat(15), fixture block(14) and the first spring(16), when the bottom end of the post(4) is inserted into the inside of the mounting groove(6), the fixture block(13) will be tightly stuck into the mounting groove(6), it can effectively increase the installation stability and the wind resistance of prefabricated modular cabin(25). The mounting plate(14) is bolted with the blot(17) to the interior of the fitting groove, that makes the locking component easy to disassemble.

3. Application method

When using, make the fitting seat(2), the base(3), the post(4) and the locking components mass produce, then assemble

them, assemble the base(3) and the locking components(10) first, after that fit the post(4) at the bottom of the prefabricated modular cabin(25) vertically, in this way, the prefabricated modular cabin(25) can be rapidly installed on the ship, it simply insert the bottom end of the post(4) into the interior of the mounting groove(6) when fitting the cabin, under the action of gravity of the cabin, the end of the fixture block(13) will be stuck into the inside of the ring groove(12), that makes the fixing of the post(4) and the purpose of rapid installation of prefabricated modular cabin(25).

4. Application effect

(1) Each set of rapid installation unit composed of one fitting seat, one base, one post and four locking components, the above components can be conveniently mass produced and assembled, during assembly, the fitting seat, the base and four locking component shall be assembled first, then fit the post vertically at the bottom of the prefabricated modular cabin, it can make the prefabricated modular cabin rapidly installed on the ship. When installing the prefabricated modular cabin, it simply insert the bottom end of the post into the interior of the mounting groove, under the action of gravity of the cabin, one end of the fixture block will be stuck into the ring groove and fixed, all that makes the installation of the prefabricated modular cabin rapid.

(2)The locking component is composed of the mounting plate, the mounting seat and the first spring, when the post is inserted into the mounting groove, the fixture block will be tightly stuck into the mounting groove and lock the post inside the mounting groove, that can effectively increase the installation stability and the wind resistance of the prefabricated modular cabin.

(3)The mounting plate is bolted to the interior of the fitting groove, this makes the locking component easy to disassemble and assemble, compare to the existing technology, that can ensure the prefabricated modular cabin could be disassembled when it needs to be.

(4)The design is reasonable, it can achieve the purpose of rapid installation of prefabricated modular cabin, also effectively reduce the difficulty of the installation and effectively improve the installation efficiency, the prefabricated modular cabins installed by rapid installation has good wind resistance performance, it can prevent being blown down by strong wind during the installation, also could be disassembled when it needs to be.

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