A SELF-LEVELING SHIP'S BERTH.

Several contrivances have from time to time been designed for the purpose of alleviating the sufferings of those who are subject, when at sea, to attacks of the dreaded *mal de mer*, but none have afforded the much desired immunity from sea-sickness. Most of the appliances introduced to prevent sea-sickness have failed, either because they would not act at all, or, when they did, produced effects that were as bad as, if not worse than the malady. These contrivances have consisted of some modification of "swinging," but the roll of the vessel has not been even effectually lessened in its disagreeable effects by this method. There are many persons who are of so peculiar a temperament that the mere rocking of a boat induces nausea, while others can enjoy a channel yachting trip in rough weather without the slightest fear of those disagreeable sensations that have been so often described, yet fail to give even a scant notion of what sea-sickness really is.

It has been stated that "the immortal Nelson," among many others, although his profession necessitated a life afloat, was a martyr to sea-sickness, while many who have resided chiefly in country districts find nothing but enjoyment in a sea voyage, and can cross the channel when a half a gale is blowing, without the least apprehension of unpleasant consequences. Among the many methods introduced that profess to afford relief are belts, medicaments, nostrums and devices, each and all of which have proved to be ineffectual.

It is necessary, in referring to the remedy, to consider the cause. The oscillation and rolling of the ship at sea tends to upset the normal condition of the individual, which, were it not for the particular tumbling action of the vessel, would not be affected. The invention to which we direct attention removes the cause, the result being that the effects are not felt, and hence the "Huston" berth is a "boon and a blessing." The peculiarity of this contrivance lies in the application of what is known as the universal joint, upon which the berth is poised, and is directed in its motion by a crescent-shaped weight, thus securing a perfectly level surface, no matter at what angle the vessel may pitch and roll. It is also controlled and regulated by India-rubber springs, preventing any tendency to jump up with a sudden jerk, and is strictly a "self-leveling berth." It occupies no more space than an ordinary berth, requires no expensive setting or adjustment, interferes in no way with the present sleeping arrangement on board ship, and can at once, if desired, be transformed into a fixed berth. Admitting the fact that sea-sickness is caused by the sufferer being forced by the law of gravitation out of his normal position, the inventor of the "Huston" self-leveling berth has adopted the universal joint principle, and thus enables a passenger to maintain a horizontal situation without being influenced by the motion of the vessel.

We see by the *British Trade Journal* that experience has proved that the invention affords relief and comfort, practical men and passengers have testified to the successful application of a most simple principle. The inventor has received numerous testimonials from persons expressing gratitude for the relief afforded. Among them is one from a private gentleman who recently took passage from Rio de Janeiro to New York in the steamship *City of Paris*. The writer, it would appear, had heard of the "Huston" berth, but had some doubts about its efficiency. His scepticism was dispelled, for he writes:—"This is a large steamer of 3,500 tons, handsomely fitted, and plenty of ice for cooling drinks. We have two cabins adjoining, and, strange to say, they are both fitted with Huston's patent berths, in which we feel very comfortable as the motion is scarcely perceptible."

KITCHEN-BOILER EXPLOSIONS.

Kitchen-boiler explosions are due to an accumulation of pressure in the boiler, in consequence of the outlets being stopped up while the fire is burning. These explosions occur during the frost through the choking up of the pipes with ice. Sometimes stop-taps are placed in the circulating pipes, and should these taps be shut, or should the circulating pipes become choked with sediment, or stopped up from any other cause, the pressure would then be bottled up and an explosion might result at any time, whether summer or winter.

To prevent this, every boiler should be fitted with a small reliable safety-valve, whether the boiler be of copper or of cast-iron, and whether it be fitted with a copper cylinder or not. A safety-vale of dead weight construction is recommended as the most simple. In the event of the outlets becoming choked, it would relieve any undue pressure and prevent an accumulation, while, at the same time, it would emit a slight hissing noise, which would tell those in the kitchen that something was wrong.

In the meantime, until a safety-valve can be fixed, open the hot-water tap in the bath-room, and any other hot-water taps connected with the boiler. If the water cannot be drawn freely from these taps, do not light the fire, and if the fire be already lighted, put it out at once. If the water flows freely the fire may then be lighted, but this must be done with caution, and the taps just described frequently opened to see that the flow continues, and that the water gradually heats. If the flow does not continue, or if the water does not heat, the supply of water to the boiler must be running short, or something must be wrong with the circulation, and the fire must be drawn. Also the cold water cistern, as well as the ball-tap should be examined, and the cold-water taps in the bath-room, and elsewhere, opened to see that the water supply is free; otherwise the boiler may run dry. When the fire is once lighted and the circulation proved to be free, the fire should be kept burning by night as well as by day as long as the frost lasts; otherwise the frost may get the mastery during the night, choke the pipes with ice, stop the circulation, bottle up the pressure, and thus lead to the bursting of the boiler. But the only true safeguard is a reliable safety-valve, and the sooner that is fixed to the boiler the better.

LAVINGTON E. FLETCHER.

AN IMPROVED MOUNTAIN RAILWAY SYSTEM.

The construction, maintenance, and operation of mountain railways have long occupied the attention of engineers. Many methods of climbing steep inclines and of rounding curves of small radius have been proposed, and several of these methods have been reduced to actual practice. The systems of Fell and Riggenbach are very well known, and the ancient system of rope tramways is in use in many places. A distinguished engineer, M. L. Edoux, has conceived a project which is based upon the application of a system of hydraulic elevators to the lifting of cars to any height. The system may be applied to great advantage, when an abundance of water under high pressure is available. These conditions will be frequently met with in a mountainous country. Although this project has not yet been realized it seems to possess sufficient merit and novelty to render it interesting to our readers. The illustrations have been specially arranged for the *Scientific American* from the author's plans, elevations, and sectional views.

The particular railway under consideration is intended to establish communication between Cauterets and the baths of La Raillère, France. Cauterets is situated in a narrow valley, at an elevation of more than 900 meters. It is a noted watering place, and during the season is filled with numbers of invalids, who go there in search of health. The hot sulphur springs for which the region is noted, are located at La Raillère, 125 meters higher up the mountain, and more than 915 meters distant.

To travel over this fatiguing route, to go and return, often twice in the same day, in the capricious weather of the mountains and in the crowded omnibuses, is uncomfortable and even dangerous to infirm persons. The waters cannot be conveyed from La Raillère to Cauterets without modifying their temperature and their chemical composition to which their therapeutic properties are due. It is, therefore, necessary to convey the sick to the springs that they may receive the full benefit of the water. This railway has been projected for the purpose of conveying the bathers from Cauterets to La Raillère.

The mode of operating the railway is as follows: The car is raised vertically by means of hydraulic elevators to a greater height than its destination, which, in the present case, is La Raillère, and is then allowed to descend as far as that place by its own gravity upon an inclined railway. To return, the car is transferred by its own gravity to a second railway inclined in the opposite direction. The cars are provided with efficient brakes, by means of which the speed may be effectually controlled.

In practice, the car is not raised the vertical distance of 125 meters at a single lift, but this distance is divided into five parts of 25 meters each. There are five towers at intervals of about 40 meters. In each one is placed a hydraulic elevator, similar to those introduced by M. Edoux into the hotels and houses of Paris. The top of each tower is a little more elevated than the foot of the next one, and is connected with it by an inclined bridge. The car is raised by the hydraulic elevator to the top of the first tower, runs by its own gravity to the base of the following one, is raised to the next level, and so on. Together they form a gigantic staircase with steps 25 meters high. The last landing place is 135 meters above Cauterets.