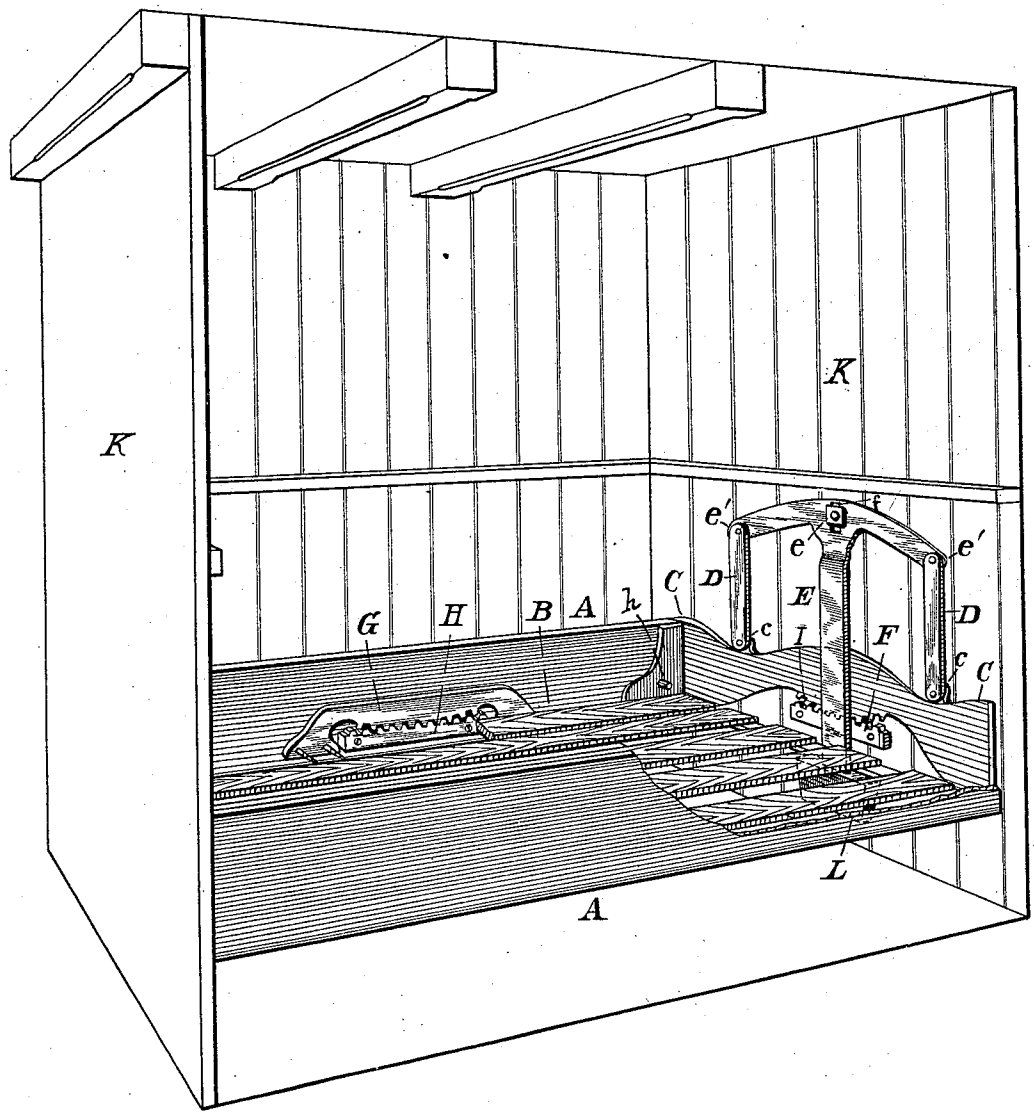
(No Model.) 3 Sheets—Sheet 1.

B. F. MERRILL.

SELF LEVELING BERTH.

No. 284,879. Patented Sept. 11, 1883.

Fig. 1.



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(No Model.) 3 Sheets—Sheet 2.

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Fig. 3.

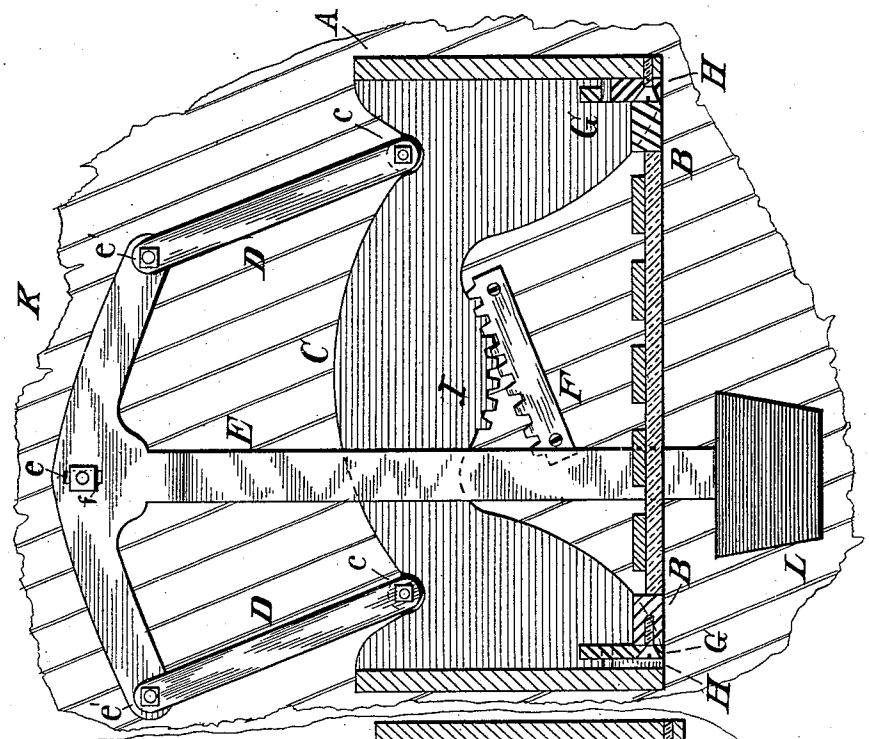
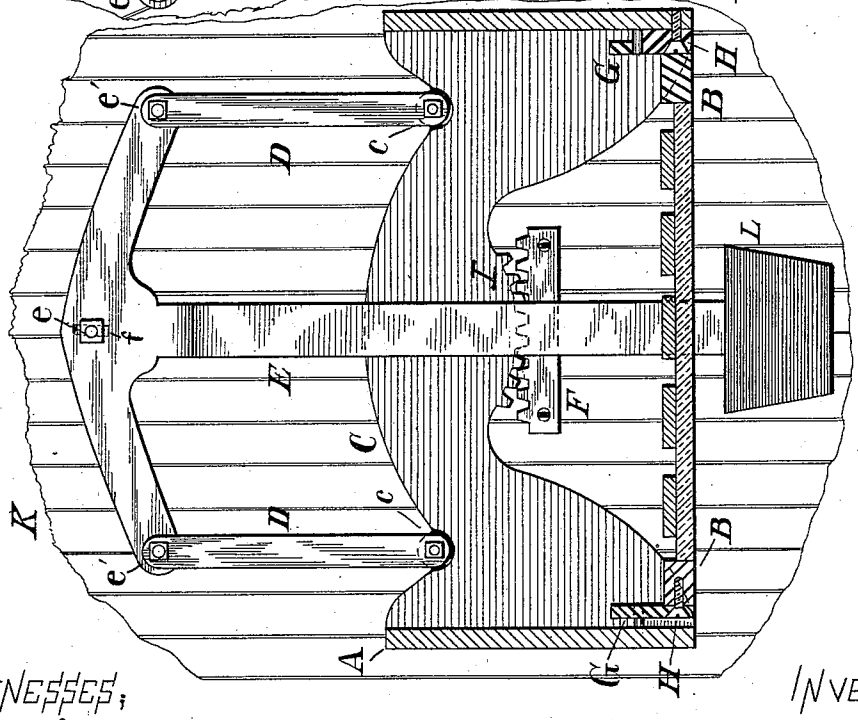


Fig. 2.



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(No Model.) 3 Sheets—Sheet 3.

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Fig. 4.

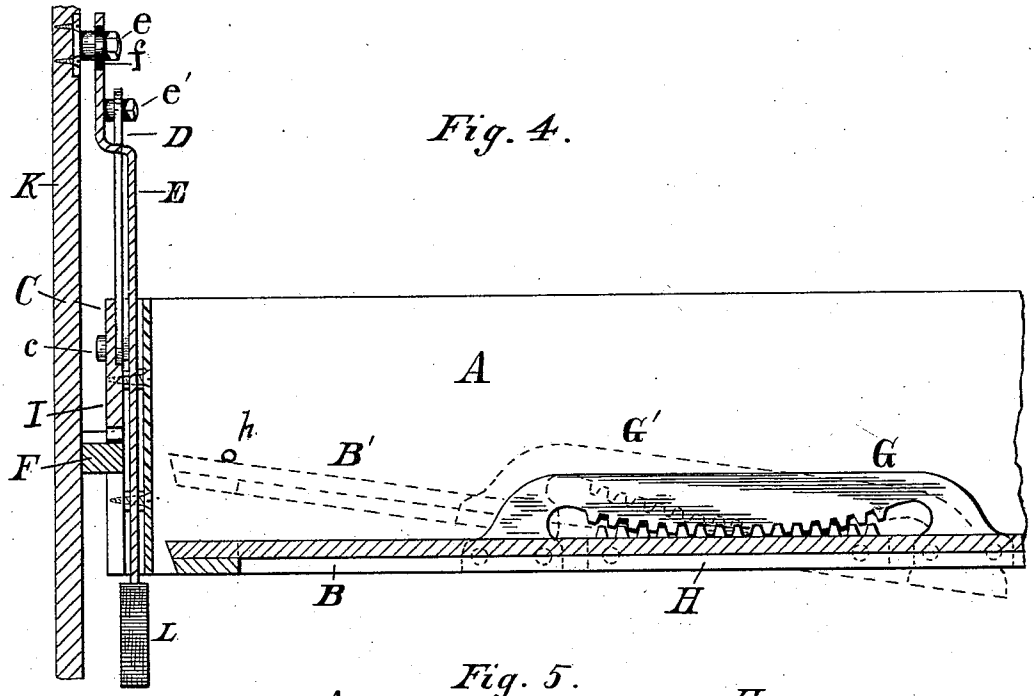
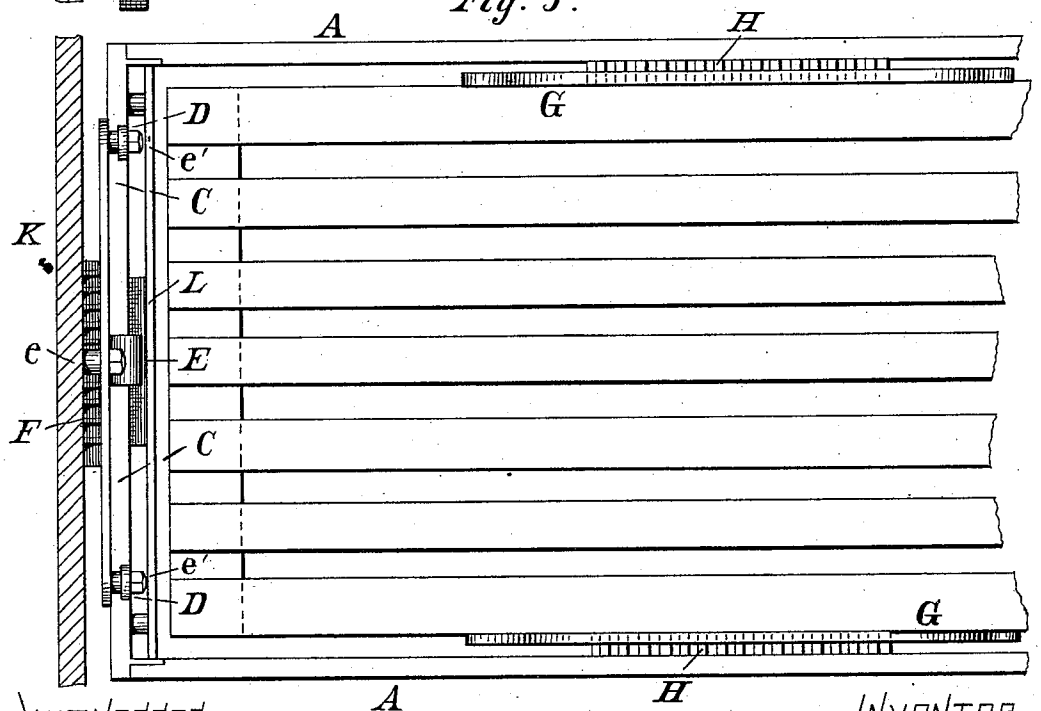


Fig. 5.



WITNESSES;

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UNITED STATES PATENT OFFICE.

BENJAMIN F. MERRILL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO PALACE MARINE BERTH COMPANY, OF PORTLAND, MAINE.

SELF-LEVELING BERTH.

SPECIFICATION forming part of Letters Patent No. 284,879, dated September 11, 1883.

Application filed November 2, 1882. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN F. MERRILL, of Boston, in the county of Suffolk and Commonwealth of Massachusetts, have invented an Improvement in Self-Leveling Berths, of which the following is a specification.

In the accompanying drawings, forming a part of this specification, Figure 1 is a perspective view of a berth embodying my invention, one end of which is not shown, and a portion of the front side being shown as broken away to give a clearer view of the details of construction. Fig. 2 is a vertical cross-section, and shows in end elevation a portion of my improvements as they are when the berth is level and the vessel upright. Fig. 3 is a similar view, showing the berth level, while the vessel is represented as rolling, and the bulk-head consequently inclined. Fig. 4 is a central longitudinal section of the suspended berth and its removable bed support or bottom, with one end omitted from the view. Fig. 5 is a top view or plan of the same.

This berth is designed to be placed lengthwise of the ship, and its self-leveling mechanism is arranged to keep it horizontal when the ship rolls. If placed athwart ships, the same mechanism tends to keep it unaffected by the pitch of the ship.

In the figures, A represents the frame of a berth embodying my invention. B is the removable bed-bottom supported in said frame, and upon which the bedding rests. C is the end of the berth-frame. K is the bulk-head. On the bulk-head is a stud, *e*, about which is guided a yoke, E, by means of a slot, *f*, formed therein. To the lower extremity of the yoke is secured a weight, L. The end of the berth-frame C is secured to the ends of the arched portion of the yoke E by links D, pivoted to said yoke at *e'* and to end C at *c*. There is also secured to the bulk-head K a metallic rack, F, firmly bolted thereto, and upon the end C of the berth-frame there is formed or attached a toothed segment or curved rack, I, which gears with the coacting rack F, as shown. The rack F sustains the weight of the berth, the links D, the yoke E, and weight L, the stud *e* serving as a pivot about which the yoke E may oscillate, and at the same time have a slightly-vertical play. As represented in the drawings, the teeth of the coacting racks "bottom"—a mechanical disadvantage which may be obviated by forming flanges upon the sides of said racks F and I, which shall come in contact before the ends of the interlocked teeth come to a bearing. These flanges will then sustain the weight of the berth and its leveling mechanism. The coacting racks F and I prevent the teeth having any independent lateral vibration irrespective of the roll of the vessel, and while leaving the berth perfectly free to assume and maintain at all times a laterally horizontal or level position, it is, as stated, thereby held from lateral vibration when the bulk-head and berth change their relative positions by reason of the rolling of the vessel. When the vessel rolls, as represented in Fig. 3, the action of gravity on the weight L, suspended on the vertical arm of the yoke E, exerts sufficient force upon the berth, through the links D, to maintain the berth in a horizontal position.

The aforesaid devices are preferably constructed of metal, so that they may be strong, and yet occupy the minimum of space. A head-board is intended to be fastened to the berth, parallel to the end C, between which and the said end the pendent arm of yoke E may swing. This head-board is omitted from the drawings to afford a clearer view of the operative devices.

The rack F may be formed as shown; or it may be curved, and the coacting rack I may be made straight; or the requisite curvature may be divided between them, giving to the toothed portion of each a curved periphery; but, however respectively shaped, they must be of such form and be so relatively placed as to sustain the weight of the berth and the leveling mechanism and remain in gear in whatever position the vessel may assume.

The berth, instead of being supported by the rack I on the rack F, might be fixed to an axle working in a bearing in the bulk-head, so that when the ship rolls and the berth oscillates under the action of the self-leveling

mechanism, the point of support of the end of the berth shall be stationary and vertically over the longitudinal axis of figure of the berth on which the weight of the berth and its occupant may be assumed to be concentrated. The support given by coacting racks or their equivalent is, however, preferable, both on account of the extended surface of support afforded, (which is secured with a minimum of friction,) and also by reason of the advantage gained by having the point of support shift relatively to the line in which the weight of the berth and its occupant acts. When the ship is on an even keel, the berth, having its occupant lying therein, is horizontal. The weight of the berth and its occupant tends to hold the berth in that position, the weight being vertically below the point of contact of the coacting racks. When the ship is rolled toward the starboard, the action of gravity causes the pendent arm and weight of yoke E to make an oscillation also toward the starboard, and thereby the berth is turned toward the port. The momentum acquired by the pendent arm of the yoke, however, tends to carry it beyond the point where it would come to rest under the action of gravity, and consequently to turn the berth slightly too far to the port; but the point of contact of the coacting racks having been simultaneously moved toward the port, the weight of the berth and its occupant acts in a vertical line to the starboard of the point of contact of the coacting racks, and tends to counteract the effect of the momentum of the pendent arm of the yoke, so that the pendulum is quickly and without jar brought to a vertical position immediately after each oscillation. The other end of the berth is constructed and supported in the same manner as described for the end shown in the drawings, though one pendulum with links, as shown, may suffice.

By a proper relative arrangement of the points C e', the axis of oscillation e, and the racks F and I, there will be little or no vertical motion of the yoke upon the stud.

When the berth is turned independently of the rolling of the ship—as, for example, by a person climbing in, or by a change in the position of the occupant—the yoke E is caused to swing from its vertical position. It then acts not only as a pendulum, but also, by reason of the free vertical motion permitted by the slot f, as a dead-weight, tending to counteract the disturbing force and restore the berth to its horizontal position. The weight L on the pendent arm of yoke E shifts laterally as the berth is turned, and acts through the links D to right the berth, with a leverage increasing with the amplitude of the arc through which the berth is turned.

What I claim is—

1. A ship-berth supported at each end upon coacting racks F and I, the one attached to the berth and the other to the bulk-head, in combination with a pendulum guided vertically upon a stud attached to the bulk-head, and oscillating upon the same about an axis parallel to the longitudinal axis of the berth, and connected to the end of the berth by links, whereby the motion of the pendulum under the action of gravity is communicated to the berth, so that the berth shall assume a horizontal position when the pendulum is vertical, substantially as shown and described.

2. A ship-berth, to an end of which is connected a pendulum free to move vertically upon a stud attached to the bulk-head, and to oscillate upon the same about an axis parallel to the longitudinal axis of the berth, and connected to an end of the berth by links, in combination with coacting racks or their equivalent as supports for the ends of the berth, whereby the weight of the berth and its occupant acts to oppose the momentum of the pendulum when a transverse oscillation is imparted to the berth, substantially as shown and described.

3. In combination with a ship-berth supported on bearings at its ends and capable of transverse oscillation thereon, the weighted yoke E, pivoted to the bulk-head, so as to have a free vertical movement on its pivot e, as shown and described, and connecting-links D, whereby when the berth is turned from a horizontal position the yoke E acts through the links D as a shifting weight to restore the berth to a horizontal position, substantially as shown and described.

4. In combination with a ship's berth, the weighted yoke capable of vertical movement on the pivotal stud attached to the bulk-head, the links connecting the yoke with the end of the berth, the supports for berth and adjusting devices, consisting of bearing-pieces on the ends of the berth and on the bulk-heads, respectively, having one of their corresponding bearing-surfaces segmental or curved and the other straight, and means for preventing the sliding or shifting of one bearing-surface upon the other longitudinally, whereby the berth will be kept in a horizontal position, and the weight of the berth and its occupant acts to oppose the momentum of the pendulum when the vessel rolls, all substantially as shown and described.

In testimony whereof I have hereunto set my hand this 23d day of October, A. D. 1882.

BENJAMIN F. MERRILL.

Witnesses:

ELMER P. HOWE,

J. CONVERSE GRAY.