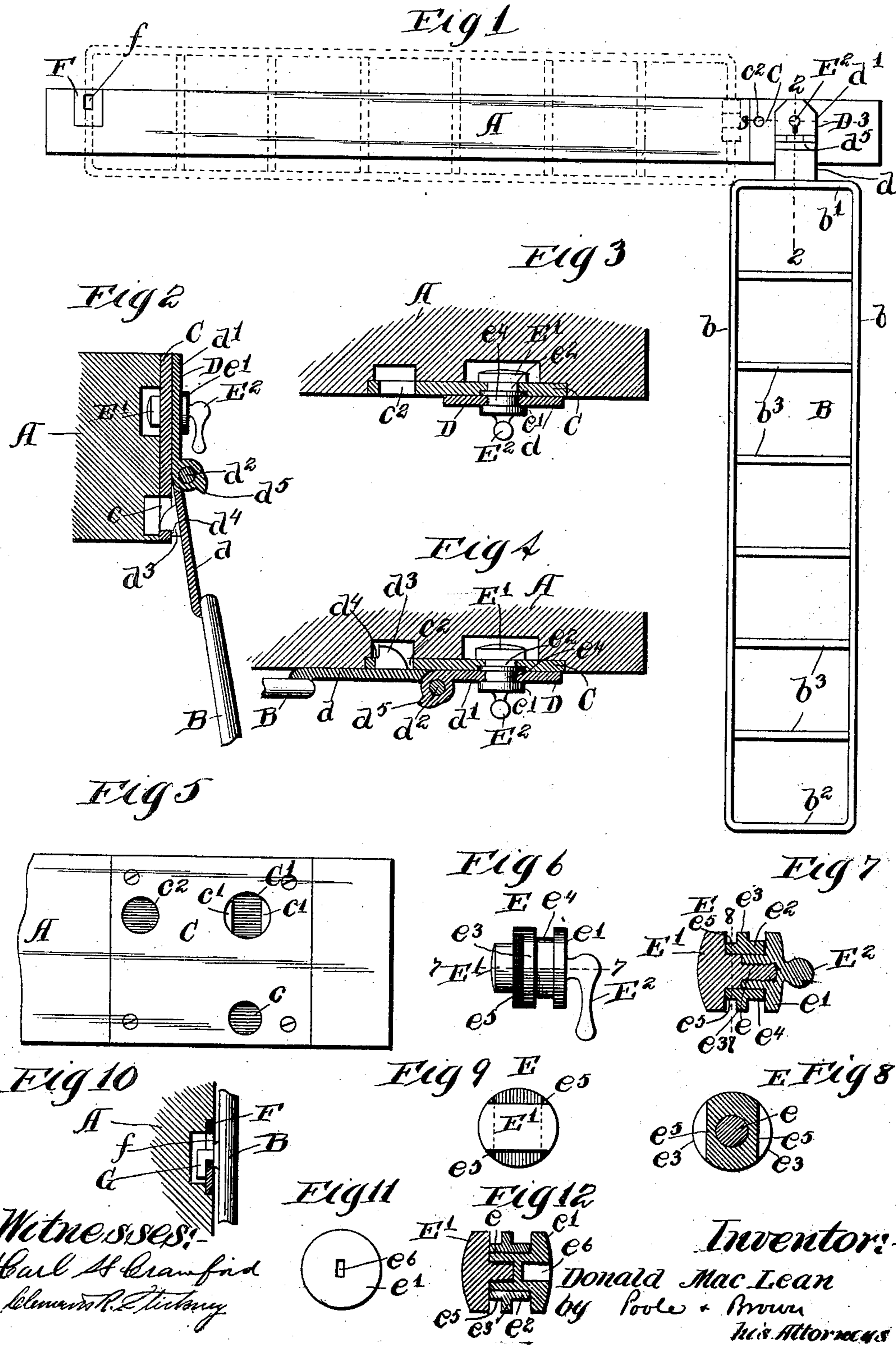


D. MACLEAN.
BERTH LADDER.

(Application filed Mar. 11, 1901.)

(No Model.)



Witnesses:
Carl H Crawford
Clement R. Tietz

Inventor:
Donald MacLean
by Poole & Brown
His Attorneys

UNITED STATES PATENT OFFICE.

DONALD MACLEAN, OF CHICAGO, ILLINOIS.

BERTH-LADDER.

SPECIFICATION forming part of Letters Patent No. 686,944, dated November 19, 1901.

Application filed March 11, 1901. Serial No. 50,576. (No model.)

To all whom it may concern:

Be it known that I, DONALD MACLEAN, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Berth-Ladders; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in berth ladders or devices intended for aiding a person in getting into and out of the upper berth of a sleeping-car or of the state-room in a vessel.

The invention consists in the matters hereinafter described, and pointed out in the appended claims.

A ladder embodying my invention has both detachable and pivotal connection at its upper end with the front rail of the upper berth in connection with which it is used and is adapted when in position for use to hang or depend from said upper rail and when not in use to be detached and placed in the upper berth or elsewhere and is also adapted to be secured in a horizontal position in front of the berth, so as to project above the front rail of the same, and thereby serve when the berth is occupied as a guard to prevent the person occupying the berth from rolling or falling out of the same.

As shown in the accompanying drawings, Figure 1 shows in front elevation the front rail of a berth and a ladder embodying my invention, the ladder being shown in full lines in its upright or depending position and in dotted lines in its horizontal position or the position which it occupies when serving as a guard. Fig. 2 is a central vertical section of the connection between the ladder and the berth-rail, taken on line 2 2 of Fig. 1. Fig. 3 is a horizontal section of the same, taken on line 3 3 of Fig. 1. Fig. 4 is a similar horizontal section showing position of the parts when the ladder is in its horizontal position. Fig. 5 is a face view of the attaching-plate, which is secured to the front rail of the berth. Fig. 6 is a view in side elevation of the detachable pivot-stud by which the ladder is connected with the front rail of the berth. Fig. 7 is a sectional view of the same, taken

on line 7 7 of Fig. 6. Fig. 8 is a cross-section of the same, taken on line 8 8 of Fig. 7. Fig. 9 is an end view of said pivot-stud. Fig. 10 is a detail section of the device for supporting the free end of the ladder when the same is in its horizontal position, taken on line 10 10 of Fig. 1. Fig. 11 is an end view of a pivot-stud provided with a key-slot, instead of with a handle, for turning it. Fig. 12 is a sectional view of the same.

As shown in said drawings, A indicates the outside or front rail of an upper berth, and B indicates as a whole the berth-ladder. The ladder B is shown as consisting of longitudinal side pieces $b\ b$, connected at their ends by cross-pieces $b' b^2$ and intermediate cross-pieces or rounds b^3 . As preferably constructed said ladder is made of metal pipe or tubing, the cross-pieces $b' b^2$ being made continuous with the side pieces $b\ b$. The devices for connecting the ladder with the berth-rail consist generally of a plate C, which is attached to the front face of said rail, and a hanger D, which is permanently attached to the upper end of the ladder and consists of two plates or sections $d\ d'$, which have hinged or pivotal connection with each other and one of which, d , is permanently affixed to the ladder, while the other one, d' , is adapted for pivotal and detachable connection with the plates C. The pivotal axis of the hinged joint connecting the plates $d\ d'$ is parallel with the end piece d of the ladder, and, as herein shown, the said plates are connected in the same manner as the parts of an ordinary hinge, the same being connected by means of a pivot-pin d^2 . The pivotal and separable connection between the outer plate d' of the hanger D and the said plate C is constructed to permit the hanger and the ladder connected therewith to swing in a vertical plane parallel with the face of the rail A, and also to permit convenient detachment of the said plate d' from the plate C. The devices herein shown for affording such pivotal and detachable connection of said plates d' and C are constructed as follows: E is a pivot-stud which is permanently connected with the plate d in such manner as to turn or rotate therein, but has detachable connection with the plate C. The said stud is provided on its inner end, which projects inwardly from the inner face of the

plate d' , with a head E' , which is flattened at its sides, and the plate C is provided with an aperture C' to receive said stud, which aperture is flattened at its sides to correspond in shape with the head E' , and these parts are so constructed that when the stud is turned in one position it may be inserted through the aperture C' , and when turned or rotated in said aperture C' the stud is locked therein by engagement of the wider part of its head with the sides of the slot behind the flattened margins thereof. To facilitate the insertion and turning of the stud E , the same is provided with a handle or lever-arm E^2 .

In order to permit free or rotary movement of the plate d' upon the stud E without liability of disengaging said stud from the plate C , a construction is provided as follows: Said stud consists of three parts—namely, a shank e , integral with the head E' , a cap e' , to which the handle E^2 is attached and which is detachably but rigidly secured to the shank e , and a sleeve e^2 , which is free to turn on the shank e between the head E' and the cap e' and is provided at its outer end adjacent to the cap e' with a cylindric bearing-surface e^4 , which engages the bearing-aperture in the plate d' . The inner part of said sleeve or that adjacent to the head E' is made larger in diameter than its outer part, so as to form a shoulder which rests in contact with the plate d' , the said enlarged part, together with the cap e' , constituting a groove which is engaged by the margins of the aperture in the said plate d' . The larger inner part of the sleeve is provided adjacent to the head E' with flat faces $e^5 e^5$, equal in width to the thickness of the plate C , the said inner end of the sleeve being made of a shape corresponding with and being adapted to fit in said aperture C' of said plate. The enlarged part of the sleeve is larger than the width of the flat faces $e^5 e^5$, so that flanges $e^3 e^3$ are formed between the said flat faces and the shoulder at the outer end of the said enlarged part, said flanges forming shoulders which bear against the outer face of the plate C when the stud is engaged with the latter. The margins of the cap e' and the shoulder at the outer end of said enlarged part of the sleeve bear against the outer and inner faces of the plate d' , so as to hold the stud from moving endwise on said plate, while permitting it to freely turn therein. The outer face of the plate C is preferably recessed to provide a depression equal in depth to the flanges $e^3 e^3$, so that said flanges fit within said depression and enable the plate d' to rest in contact with the plate C when the hanger is connected with said plate. Said cap e' and the shank e are adapted to be turned within the sleeve e^2 , so as to bring the head E' with its flat faces either parallel with the flat faces e^5 of the sleeve or at right angles thereto. The cap e' is detachably connected with the shank e , so as to enable the parts to be separated for connecting them with the plate d' , these parts being shown as connected by a screw-

joint in the shank. In connecting the hanger D with the said plate C the handle E^2 is rotated so as to bring the flat faces of the plate C parallel with the flat side faces e^5 of the sleeve. The said head and the inner end of the sleeve are then inserted in the aperture C' , the flattened inner ends of the sleeve fitting within the aperture c' , while the head extends into the space behind the plate C . Said shank may be turned by means of the handle E^2 , so as to bring the head transversely with respect to the parallel sides of the slot C' , thus locking the stud firmly upon the plate C . To disconnect the hanger from the berth-rail, it is merely necessary to turn the handle E^2 until the flat sides of the head E' are parallel with the flat sides of the sleeve e^2 , when the stud can be withdrawn from the aperture C' of said plate C . Manifestly when the stud is interlocked with the plate C in the manner described the hanger D may swing freely on the pivot-stud without liability of disconnecting the stud as a whole from the plate, the sleeve on which the hanger directly swings or pivots being locked from rotation in said plate.

The ladder B when in use may be placed in either of two positions—that is to say, either vertically, which will be the position when used for climbing into the upper berth, or horizontally when the ladder is employed as a guard to prevent the occupant of the berth from falling or rolling out of the same—the pivotal connection of the hanger D with the plate C afforded by the pivot-stud E enabling the ladder to be swung into either of the positions described and as shown in full and dotted lines in Fig. 1.

When the ladder is in its vertical position, it is desirable that its lower end should be rigidly held or secured from sidewise or lateral movement, and for this purpose I provide on the inner surface of the plate d of the hanger an inwardly-projecting stud d^3 , and I provide in the plate C below the aperture C' a hole c , adapted to receive or have interlocking engagement with said stud d^3 . The stud d^3 is arranged to engage the hole c when the ladder is in a nearly vertical position; but it may be readily disengaged from the hole c by swinging the lower end of the ladder outward. Manifestly in this construction the weight of a person resting on the ladder in ascending the same tends to hold the stud d^3 firmly in the hole c , and thus rigidly lock the ladder from lateral movement. I prefer that the ladder should stand with its lower end outwardly inclined from a vertical plane when in position for use, and for this purpose I provide the stud d^3 with a shoulder d^4 , Fig. 2, adapted to engage the outer face of the plate C at the margin of the hole c , so as to prevent the ladder from swinging back into a vertical position. The outwardly-inclined position of the ladder makes it more convenient for use and at the same time insures that the weight of the person on the

same will hold the stud d^3 thereon firmly interlocked with the hole c .

To prevent the ladder being swung too far outward when its lower end is moved outwardly to release the stud d^3 from the hole c , I provide on the plate d' a stop projection d^5 , Fig. 2, which will be encountered by the plate d in such manner as to limit the outward movement of the said plate.

To provide means for supporting the ladder B in its horizontal position, a holding-plate F is attached to the rail A at a point opposite the lower part of the ladder when the same is raised to its horizontal position, and I provide the lower end of the ladder with a locking-arm G, the extremity of which is bent downwardly, said arm being adapted to enter and engage a slot f , formed in said plate F. Said slot f is arranged vertically and is of such length as to permit the passage therethrough of the downwardly-bent end of the arm G. Said arm G is interlocked with the plate F by a slight downward movement of the end of the ladder after the stud has been inserted in said slot, Fig. 8. In order to accommodate the stud d^3 on the hanger-plate d at the time the ladder is placed in its horizontal position, the plate C, Figs. 3, 4, and 5, is provided with a hole c^2 , the rail A being provided with a recess at the rear of said hole to afford room for the end of the said stud which projects inwardly past the said plate C. When the ladder is being swung or moved from its horizontal to its vertical position, the stud d^3 will by its contact with the outer face of the plate hold the ladder outwardly inclined, with its lower end so far outward as to clear the lower berth as it is swung downward.

The hinged hanger D, pivotally connected with the rail, as described in connection with the plate F and arm G, affords a means of rigidly and permanently holding the ladder in its horizontal position in front of the front rail of the berth, so that said ladder when in the position described affords a strong and reliable guard to prevent the occupant of the berth from rolling out of the same. The pivot-stud, arranged for detachable connection with the berth-rail, as described, also affords an easily-operated and convenient means of detaching the ladder from the berth-rail when it is desired to store away the ladder, as will be the case in the application of the device to the berths of sleeping-cars, the ladder in such case being placed in the upper berth, so that it will be concealed and out of the way when the upper berth is folded upwardly, as in the daytime.

In Figs. 11 and 12 I have shown the pivot-stud as provided with a flat outer end or face and with a slot or groove e^6 , in which a flat implement or key may be inserted for turning the stud in connecting the ladder or detaching it from the berth-rail. This construction will be preferable to that in which the pivot-stud is provided with a handle in some

instances, as when the ladder is used in connection with a sleeping-car berth, or other cases where the presence of projecting parts, such as the said handle, is objectionable or undesirable.

I claim as my invention—

1. The combination with a berth-rail, of a ladder and means for detachably and pivotally connecting the ladder with the rail, embracing a plate on the rail, separable interlocking parts in the ladder and plate, and a pivot about which the ladder is adapted to swing laterally.

2. The combination with a berth-rail, of a ladder, and means affording pivotal and detachable connection of the ladder with the rail, embracing a pivot which has detachable interlocking connection with the rail.

3. The combination with a berth-rail, of a ladder, and means for detachably and pivotally connecting the ladder with the rail, embracing separable interlocking parts in the ladder and rail, and two pivotal or hinged joints, one permitting lateral and the other forward and rearward swinging movement in the lower end of the ladder.

4. The combination with a berth-rail, of a ladder and means for pivotally connecting the ladder with the rail, embracing a pivot permitting the lateral swinging of the ladder, a hinge permitting forward and rearward movement of the ladder, and two interlocking parts, one on the ladder and the other on the rail adapted for engagement when the ladder is in position for use and which may be disconnected to permit the lateral swinging of the ladder by swinging the lower end of the ladder outward.

5. The combination with a berth-rail, and a ladder, of a pivotal and detachable connection between said ladder and rail, embracing a plate on the rail, and a pivot-stud having rotative engagement with the ladder, and detachable interlocking connection with the plate.

6. The combination with a berth-rail, and a ladder, of means for detachably connecting one end of the ladder with the berth-rail when the ladder is in position for use, and means for detachably and rigidly securing the ladder in a horizontal position on the rail with its upper part projecting above the rail to form a guard.

7. The combination with a berth-rail and a ladder, of a hanger consisting of two plates connected by a hinge, one of said plates being rigidly attached to the ladder and the other being pivotally connected with the said rail so as to swing in a vertical plane parallel with the face of the rail.

8. The combination with a berth-rail and a ladder, of a hanger consisting of two plates connected by a hinged joint, one of said plates being rigidly attached to the ladder and the other being provided with a rotative pivot-stud adapted for separable interlocking engagement with the rail.

9. The combination with a rail, of an attached plate thereon provided with a flat-sided aperture, a ladder, a hanger attached to the ladder, and a pivot-stud having rotative connection with the said hanger and provided with a head adapted to pass through said aperture and to be interlocked with the said plate.

10. The combination with a berth-rail and a ladder, of a hanger, a plate attached to the rail provided with a flat-sided aperture, a pivot-stud having rotative connection with the hanger and embracing a shank provided with a flattened head, and a sleeve on the shank, the inner end of which is adapted to fit within the aperture of the plate.

11. The combination with a berth-rail and a ladder, of a plate attached to the rail, a hanger consisting of two plates hinged together, one of which is attached rigidly to the ladder, a pivot-stud for connecting the hanger with the plate on the berth-rail, and a stud on the plate of the hanger which is attached to the ladder, said stud being adapted to engage a hole in the plate on the rail to hold the ladder from swinging sidewise when in operative position.

12. The combination with a berth-rail, a

plate attached to the rail, a hanger consisting of two plates hinged together, one of which is rigidly attached to the ladder, and a pivot-stud connecting the outer plate of the hanger with the berth-rail, the inner hanger-plate being provided with a stud which is adapted to engage a hole in the plate on the rail to hold the ladder from swinging sidewise, said stud having a shoulder which engages the said plate so as to hold the ladder in an outwardly-inclined position.

13. The combination with a berth-rail and a ladder, of a hanger consisting of two parts hinged to each other, one of which is rigidly attached to the ladder and the other of which has pivotal and detachable connection with the berth-rail, and means for connecting the lower end of the ladder with the berth embracing a slotted plate on the berth-rail and a hook-shaped arm on the ladder.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 7th day of March, A. D. 1901.

DONALD MACLEAN.

Witnesses:

C. CLARENCE POOLE,
GERTRUDE BRYCE.