E. J. SIMS.

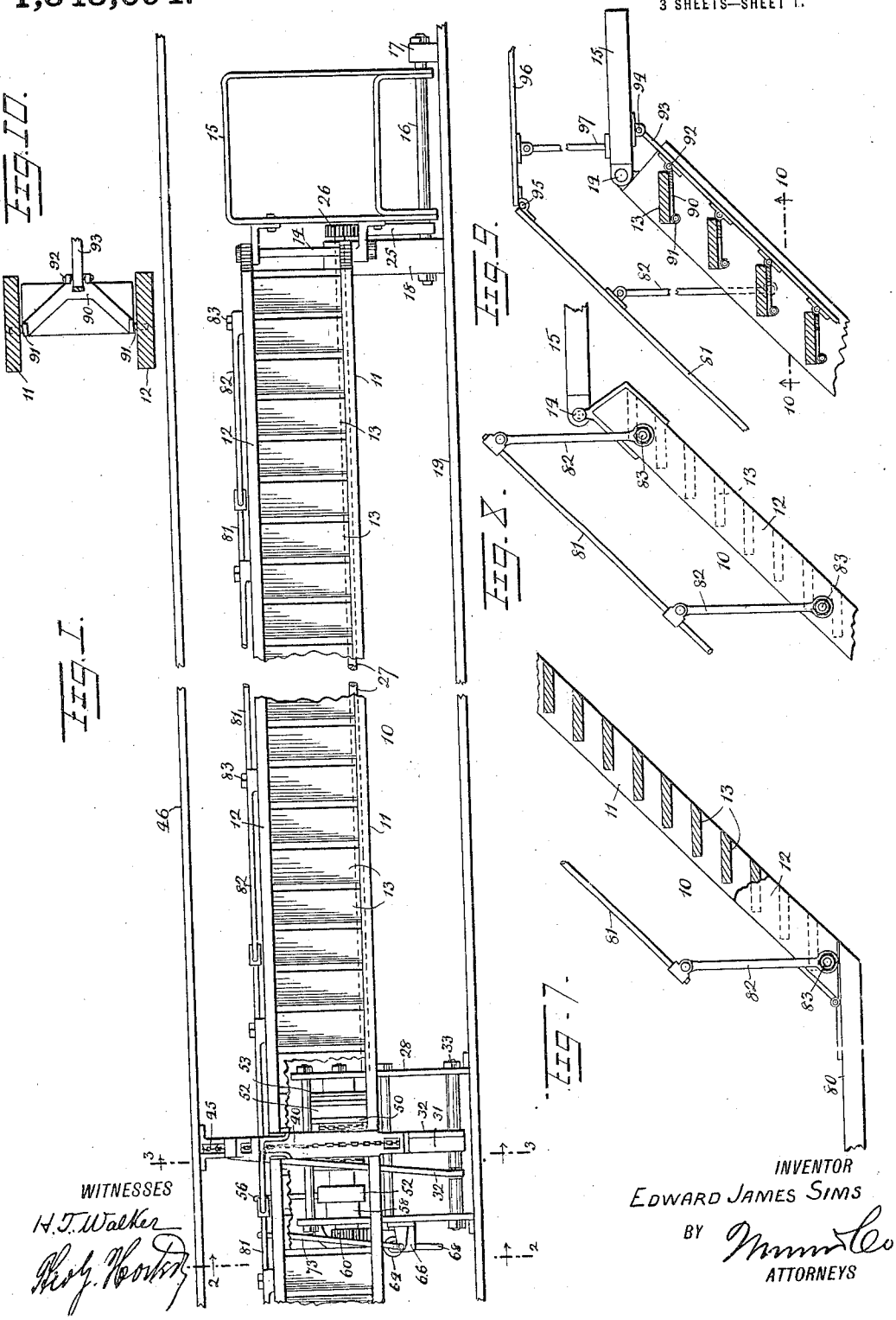
ACCOMMODATION LADDER FOR MARINE VESSELS.

APPLICATION FILED NOV. 14, 1918.

1,343,094.

Patented June 8, 1920.

3 SHEETS—SHEET 1.



WITNESSES

H. J. Walker

Roy J. Newton

INVENTOR

EDWARD JAMES SIMS

BY Munn & Co

ATTORNEYS

E. J. SIMS.

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3 SHEETS—SHEET 2.

Fig. 2.

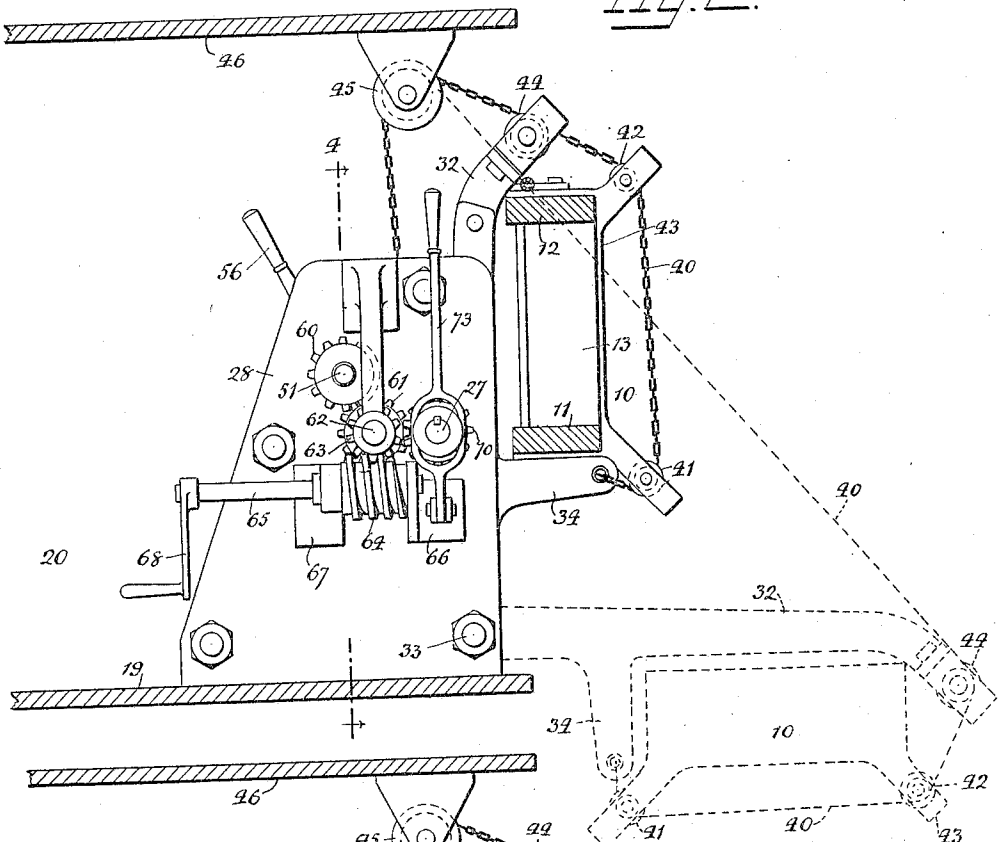
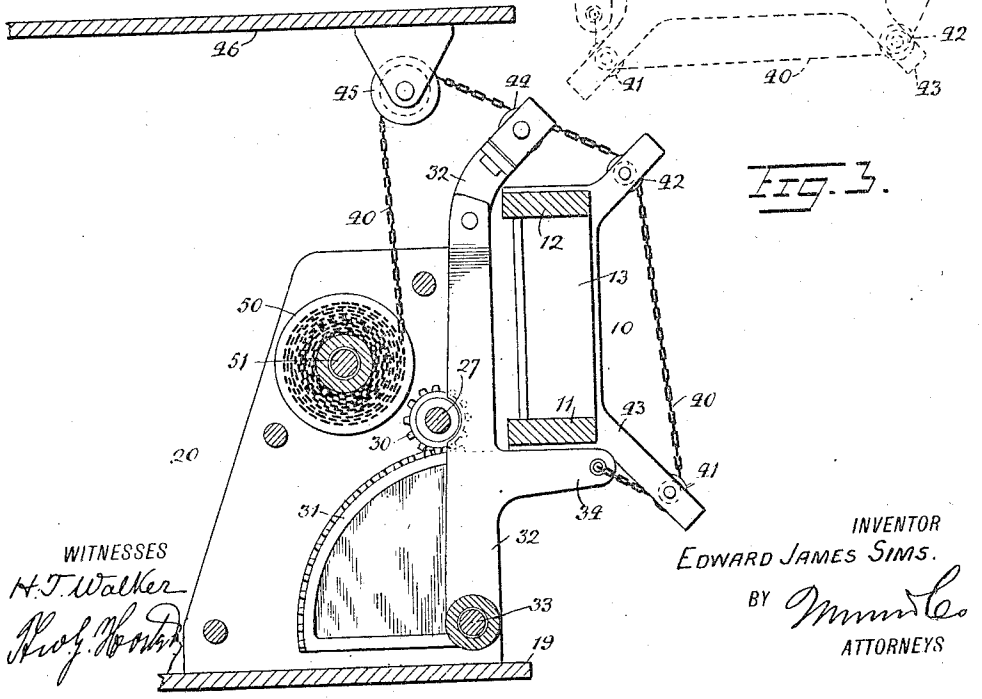



Fig. 3.




WITNESSES

H. T. Walker

Prof. Woodard

INVENTOR

EDWARD JAMES SIMS.

BY Munn & Co.

ATTORNEYS

E. J. SIMS.

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3 SHEETS—SHEET 3.

Fig. 4.

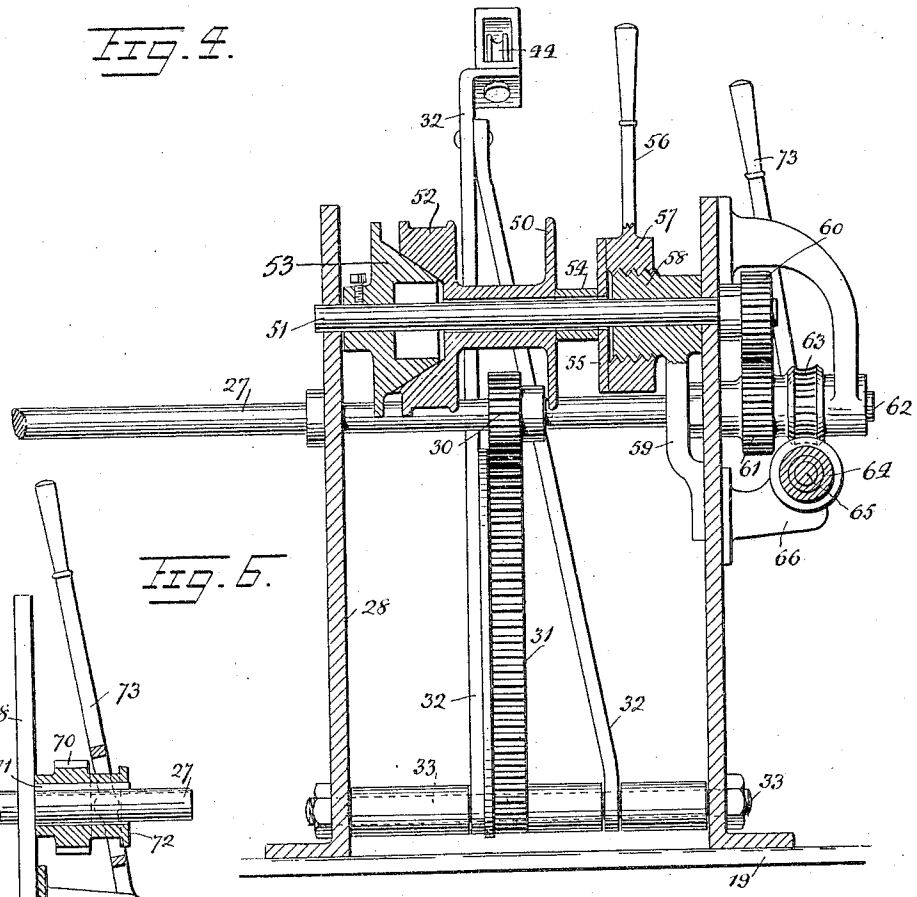
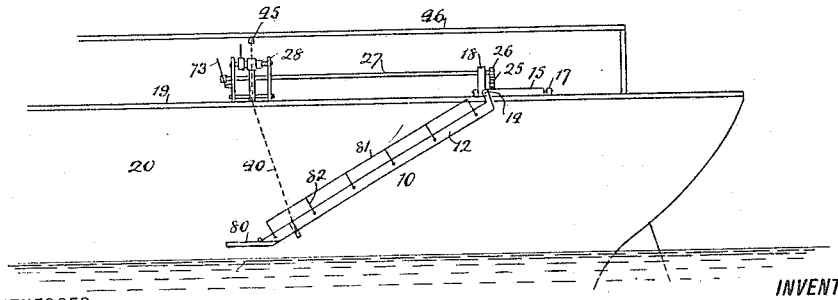



Fig. 6.




Fig. 5.




WITNESSES

H. T. Walker

Rud. J. Hoster

INVENTOR

EDWARD JAMES SIMS.

BY Munn & Co

ATTORNEYS

# UNITED STATES PATENT OFFICE.

EDWARD JAMES SIMS, OF BROOKLYN, NEW YORK.

## ACCOMMODATION-LADDER FOR MARINE VESSELS.

1,343,094. Specification of Letters Patent. Patented June 8, 1920.

Application filed November 14, 1918. Serial No. 262,517.

*To all whom it may concern:*

Be it known that I, EDWARD JAMES SIMS, a citizen of the United States, and a resident of the city of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented new and Improved Accommodation-Ladders for Marine Vessels, of which the following is a full, clear, and exact description.

The object of the invention is to provide a new and improved accommodation ladder for marine vessels arranged to permit of conveniently and quickly moving the stairway or ladder into position for use on the side of a marine vessel or returning it to normal inactive position on deck when not in use. Another object is to prevent the stairway from being broken or otherwise damaged while moving it into position for use or back for storing purposes. Another object is to safely hold the stairway in position for use to allow persons to safely board or leave the marine vessel.

With these and other objects in view the invention consists of certain novel features of construction as hereinafter shown and described and then specifically pointed out in the claims.

A practical embodiment of the invention is represented in the accompanying drawings, forming a part of this specification in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the accommodation ladder in normal inactive position on the deck of a vessel, parts being shown broken out;

Fig. 2 is an enlarged cross section of the same on the line 2—2 of Fig. 1;

Fig. 3 is a similar view of the same on the line 3—3 of Fig. 1;

Fig. 4 is a longitudinal section of the same on the line 4—4 of Fig. 2;

Fig. 5 is a reduced side elevation of the accommodation ladder in lowered position on the side of a marine vessel;

Fig. 6 is a sectional side elevation of the shifting means for connecting or disconnecting the driving shaft and the pinion shaft;

Fig. 7 is a side elevation partly in section of the lower end of the stairway;

Fig. 8 is a side elevation of the upper portion of the stairway and its connection with the platform;

Fig. 9 is a sectional side elevation of the upper end of a modified form of the stairway attached to the platform; and

Fig. 10 is an inverted sectional plan view of the same on the line 10—10 of Fig. 9.

The stairway 10 of the accommodation ladder consists essentially of the stringers 11 and 12 and treads 13, and the upper ends of the stringers 11 and 12 are mounted to swing on a pivot 14 attached to one side of a platform 15 mounted to swing on a pivot 16 attached to brackets 17 and 18 mounted on one side of the deck 19 of a marine vessel 20 on which the accommodation ladder is used. When the accommodation ladder is not in use the platform 15 extends vertically and the stairway 10 is disposed edgewise in a horizontal position along the deck 19 at one side of the vessel, as plainly indicated in Figs. 1, 2, and 3. When the accommodation ladder is to be used the platform 15 is swung outward and downward to project approximately horizontally from the side of the deck 19 and as the stairway 10 is pivoted to the platform 15 it is carried along into a flat horizontal position, as indicated in dotted lines in Fig. 2. When the stairway is in this position it can swing downward on the pivot 14 as a fulcrum to assume the desired inclined position on the side of the vessel, as indicated in Fig. 5.

In order to swing the platform 15 from the normal vertical position into extended horizontal position and back to vertical position, the following arrangement is made: On one side of the platform 15 is secured a segmental gear wheel 25, the axis of which coincides with that of the pivot 16, and the said segmental gear wheel 25 is in mesh with a pinion 26 secured on one end of a pinion shaft 27 journaled at one end in the bracket 18 and at the other end in a frame 28 mounted on the deck 19 a distance from the platform 15. On turning the pinion shaft 27 in one direction the pinion 26 in mesh with the segmental gear wheel 25 causes the platform 15 to swing downward into a horizontal position, and on turning the pinion shaft 27 in a reverse direction the platform 15 is swung back into vertical position.

In order to swing the stairway 10 downward into inclined position and back to horizontal flat position, as previously explained, the following arrangement is made: On the

pinion shaft 27 is secured a second pinion 30 extending within the framework 28 and in mesh with a segmental gear wheel 31 secured on an arm 32 mounted to swing on a pivot 33 held on the frame 28, the axis of the pivot 33 and that of the segmental gear wheel 31 coinciding, as plainly indicated in Fig. 3. The arm 32 is provided with an angular bracket 34 forming a rest or a support for the stringer 11 of the stairway 10 to rest on while the stairway is in inactive position on one side of the vessel, as indicated in Figs. 1, 2 and 3. On the outer end of the bracket 34 is secured one end of a chain, cable, or other flexible connection 40 which extends around guide pulleys 41, 42 journaled on a bracket 43 forming part of the stairway 10 and attached to the stringers 11 and 12. The flexible connection 40 also passes over a guide pulley 44 journaled on the free end of the arm 32 and then the flexible connection passes over a guide pulley 45 held on the under side of a deck 46 arranged above the deck 19. The flexible connection 40 after leaving the guide pulley 45 winds and unwinds on a drum 50 mounted to rotate loosely on a drum shaft 51 journaled on the frame 28. The drum 50 is provided at one side (see Fig. 4) with a conical friction clutch member 52 adapted to be engaged by a similar clutch member 53 secured to the drum shaft 51. The other side of the drum 50 is engaged by a sleeve 54 abutting against a shifting member 55 having a handle 56 and provided with a screw thread 57 screwing on a threaded boss 58 provided with an arm 59 bolted or otherwise fastened to the frame 28. On turning the handle 56 in one direction the shifting member 55 is moved toward the drum 50 thus shifting the latter into frictional engagement with the fixed clutch member 53 thereby causing the drum 50 to rotate with the drum shaft 51. When the handle 56 is swung in the opposite direction then the drum 50 is moved out of engagement with the clutch member 53 to allow the drum 50 to rotate loosely on the drum shaft 51, the coacting faces of the members 52 and 53 being such, or so tapered, as to prevent them from binding or adhering when the handle is in the last-named position. This is particularly true, in view of the weight of the ladder and the platform together with the flexible connection or cable 40.

In order to rotate the drum shaft 51 and the pinion shaft 27, the following arrangement is made: On the drum shaft 51 is secured a gear wheel 60 in mesh with a gear wheel 61 secured on a worm wheel shaft 62 journaled on the frame 28. On the worm wheel shaft 62 is secured a worm wheel 63 in mesh with a worm 64 secured on a worm shaft 65 extending transversely and journaled in suitable bearings 66 and 67 attached to or forming part of the frame 28. The worm shaft 65 is provided with a handle 68 to permit of turning the worm shaft by hand, but, if desired, the shaft 65 may be connected with and turned by a winch such as used on board of a marine vessel, to allow of turning the shaft 65 by power. The gear wheel 61 is in mesh with a gear wheel 70 mounted to slide on and to turn with the pinion shaft 27, as plainly shown in Fig. 6, it being understood that for this purpose the gear wheel 70 is mounted to slide on a key 71 arranged on the pinion shaft 27. The gear wheel 70 is provided with a shifting collar 72 engaged by a shifting lever 73 fulcrumed on the bracket 66 and under the control of an operator to permit of moving the gear wheel 70 into or out of mesh with the gear wheel 61. It will be noticed that when the gear wheel 70 is in mesh with the gear wheel 61 and the worm shaft 65 is turned then the pinion shaft 27 and the drum shaft 51 are rotated in unison, and when the gear wheel 70 is moved out of mesh with the gear wheel 61 then the pinion shaft 27 is disconnected from the worm shaft 65 to allow of operating the drum 50 independent of the pinion shaft 27.

The operation is as follows:

When the several parts are in the position shown in Figs. 1, 2 and 3, then the stairway 10 is in inactive position on one side of the vessel, and when it is desired to make use of the accommodation ladder then the worm shaft 65 is turned in one direction to simultaneously rotate the pinion shaft 27 and the drum shaft 51 connected with the drum 50 by the clutch members 53 and 52. The rotary motion given to the pinion shaft 27 causes the pinions 30 and 26 to turn their segmental gear wheels 25 and 31 to swing the platform 15 and the arm 32 simultaneously downwardly and outwardly into an approximately horizontal position. The rotary motion given to the drum shaft 51 causes the drum 50 to unwind a portion of the flexible connection 40 to allow the downward swinging movement of the arm 32 with the stairway 10 held in position by the flexible connection 40 on the bracket 34. When the arm 32 reaches a horizontal position, indicated in dotted lines in Fig. 2, then the flexible connection 40 solely supports the free end of the stairway 10 owing to the stringer 11 being now free of the bracket 34, as will be readily understood by reference to the dotted line position shown in Fig. 2. When the platform 15 and the arm 32 reach a horizontal position as above described then the worm shaft is stopped and the operator now actuates the lever 73 and moves the gear wheel 70 out of mesh with the gear wheel 61 thus stopping further rotation of the pinion shaft 27. It is understood that the stairway 10 is now clear of the

side of the vessel and the platform 15 rests at its inner portion on the deck 19 thus preventing further downward swinging movement of the platform 15 and the arm 32 as both are connected with the pinion shaft 27. The operator now manipulates the handle 56 to disconnect the drum 50 from the drum shaft 51 and thus allow the drum 50 to rotate loosely on the said drum shaft 51. The weight of the free end of the stairway 10 on the flexible connection 40 exerts a pull on the said flexible connection thereby unwinding the same from the drum 50 and allowing the stairway 10 to swing downward into inclined position, as shown in Fig. 5. When this inclined position is reached the treads 13 of the stairway are in an approximately horizontal position and further downward movement of the stairway is now checked by the operator manipulating the handle 56 with a view to throw the clutch member 53 in engagement with the clutch member 52 to lock the drum 50 to the shaft 51 now held against rotation by the action of the worm wheel 63 and the worm 64. The stairway 10 is now in position for use of persons boarding or leaving the vessel 20.

In order to return the stairway 10 to its normal position of rest on the deck 19 the worm shaft 65 is rotated in a reverse direction to rotate the drum shaft 51 and the drum 50 with a view to wind up the flexible connection 40. In winding up the flexible connection 40 the stairway 10 is swung upward on the pivot 14 as the fulcrum and when the stairway reaches a horizontal position then the operator manipulates the lever 73 and throws the gear wheel 70 in mesh with the gear wheel 61 to rotate the pinion shaft 27 simultaneously with the drum shaft 51 whereby further winding up of the flexible connection 40 on the drum 50 takes place and at the same time a similar upward swinging movement is given to the platform 15 and the arm 32. It will be noticed that the stairway 10 is now bodily carried upward and inward by the platform 15 and the flexible connection 40, and when the platform 15 and the arm 32 reach vertical positions the worm shaft 65 is stopped. The free end of the stairway 10 now rests on the bracket or arm 34 and is held against accidental outward movement by the flexible connection 40, as will be readily understood by reference to Figs. 2 and 3.

The lower end of the stairway 10 is preferably provided with a hinged landing platform 80 and a suitable hand rail 81 extends on the outer side of the stairway 10 and is mounted on arms 82 fastened by bolts 83 to the outside of the stringer 12. When the stairway is not in use the bolts 83 are loosened to allow of folding the rail 81 alongside of the stringer 12. The platform 80 can also be folded upon the stairway when the latter is not in use.

The treads 13 instead of being fixed to the stringers 11 and 12 may be pivotally connected with the stringers and for this purpose each of the treads 13 is provided on the under side with a bracket 90 provided with trunnions 91 journaled in the stringers 11 and 12. The brackets 90 of the treads 13 are pivotally connected at 92 with a rod 93 pivotally connected at its upper end with a bracket 94 attached to the under side of the platform 15. When the stairway 10 is in uppermost position the treads 13 extend one alongside the other, and when the stairway is swung downward into inclined position then the rod 93 imparts a swinging motion to the treads and the latter assume a horizontal position at the time the stairway reaches the desired inclined position for use. When the stairway is swung upward back to horizontal position then the treads 13 are caused to swing back to their position one alongside the other by the action of the rod 93.

In the construction shown in Fig. 9, the upper end of the hand rail 81 is preferably pivotally connected by a hinge 95 with a hand rail 96 mounted on posts 97 attached to the front end of the platform 15.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:—

1. An accommodation ladder for marine vessels, comprising a stairway, a pivot on which the upper end of the stairway is mounted to swing, means normally supporting the stairway edgewise on one side of the vessel and including an arm mounted to swing up and down on the vessel and having an angular rest on which rests one of the stringers of the stairway to normally support the ladder edgewise on the side of the vessel, means for bodily swinging the stairway downwardly and outwardly on the side of the vessel to lie down flat in horizontal position, and means connected with the free end of the stairway for swinging the stairway downward to assume an inclined position on the side of the vessel.

2. An accommodation ladder, comprising a platform mounted to swing transversely up or down on a side of a vessel, a stairway mounted to swing at one end on one side of the said platform, the stairway in the up position of the platform being disposed edgewise at the side of the vessel, supporting means for the free end of the stairway to rest on edgewise, holding means coöperating with the said supporting means to hold the free end of the stairway in position on the said supporting means, and means for simultaneously imparting an outward and downward swinging motion to the said platform and the said supporting means and gradu-

ally lengthening the said holding means to allow the stairway to assume a flat horizontal position at the side of the vessel.

3. An accommodation ladder, comprising a platform mounted to swing transversely up or down on a side of a vessel, a stairway mounted to swing at one end on one side of the said platform, the stairway in the up position of the platform being disposed edgewise at the side of the vessel, supporting means for the free end of the stairway to rest on edgewise, holding means coöperating with the said supporting means to hold the free end of the stairway in position on the said supporting means, means for simultaneously imparting an outward and downward swinging motion to the said platform and the said supporting means and gradually lengthening the said holding means to allow the stairway to assume a flat horizontal position at the side of the vessel, and means subsequently lengthening the said holding means to allow the stairway to swing into an inclined position on the side of the vessel.

4. An accommodation ladder for marine vessels, comprising a gangway platform mounted to swing up or down on the side of a marine vessel, a stairway pivoted at its upper end on one side of the said gangway platform to swing down or up on the said side of the vessel, a flexible connection extending under the lower end of the said stairway, a deck drum on which winds one end of the said flexible connection, an arm mounted to swing and over which passes the said flexible connection, the other end of the latter being fastened to the said arm, and means for imparting simultaneously a swinging motion to the said platform and the said arm and winding up or unwinding movement to the said flexible connection.

5. An accommodation ladder for marine vessels, comprising a gangway platform mounted to swing up or down on the side of a marine vessel, a stairway pivoted at its upper end on one side of the said gangway platform to swing down or up on the said side of the vessel, a flexible connection extending under the lower end of the said stairway, a deck drum on which winds one end of the said flexible connection, an arm mounted to swing and over which passes the said flexible connection, the other end of the latter being fastened to the said arm, segmental gear wheels secured on the said platform and the said arm, a shaft arranged lengthwise on the side of the vessel and provided with pinions in mesh with the said segmental gear wheels, and driving means for turning the said drum and the said shaft in unison.

6. An accommodation ladder for marine vessels, comprising a gangway platform mounted to swing up or down on the side of a marine vessel, a stairway pivoted at its upper end on one side of the said gangway platform to swing down or up on the said side of the vessel, a flexible connection extending under the lower end of the said stairway, a deck drum on which winds one end of the said flexible connection, an arm mounted to swing and over which passes the said flexible connection, the other end of the latter being fastened to the said arm, segmental gear wheels secured on the said platform and the said arm, a shaft arranged lengthwise on the side of the vessel and provided with pinions in mesh with the said segmental gear wheels, driving means for turning the said drum and the said shaft in unison to move the said platform and arm from approximately vertical position into approximately horizontal position and vice versa, and means for disconnecting the driving means of the shaft from the said driving means of the drum to allow further turning of the drum for further unwinding or winding up of the said flexible connection after the shaft is at a standstill.

7. An accommodation ladder, comprising a platform mounted to swing up or down on the side of a vessel, a stairway fulcrumed on one side of the said platform, an arm mounted to swing up and down on the vessel in unison with the said platform, and an angular rest on the said arm and on which rests one of the stringers of the said stairway to normally support the latter edgewise on the side of the vessel.

8. An accommodation ladder, comprising a platform mounted to swing up or down on the side of a vessel, a stairway fulcrumed on one side of the said platform, an arm mounted to swing up and down on the vessel in unison with the said platform, an angular rest on the said arm and on which rests one of the stringers of the said stairway to normally support the latter edgewise on the side of the vessel, and a flexible connection attached at one end to the said arm and passing around the outer side of the said stairway to hold the latter in place on the said rest.

9. An accommodation ladder, comprising a platform mounted to swing up or down on the side of a vessel, a stairway fulcrumed on one side of the said platform, an arm mounted to swing up and down on the vessel in unison with the said platform, an angular rest on the said arm and on which rests one of the stringers of the said stairway to normally support the latter edgewise on the side of the vessel, a flexible connection attached at one end to the said arm and passing around the outer side of the said stairway to hold the latter in place on the said rest, a guide pulley on the free end of the said arm and over which passes the

said flexible connection, and a drum on which winds and unwinds the said flexible connection.

10. In an accommodation ladder, a platform mounted to swing transversely on one side of a vessel, a stairway mounted to swing at its upper end on one side of the platform, an arm spaced from the said platform and mounted to swing transversely on the said side of the vessel, the said arm having an angular rest for the stairway to rest on, segmental gear wheels secured on the said platform and the said arm, a pinion shaft extending lengthwise of the vessel and provided with pinions in mesh with the said segmental gear wheels, a drum shaft parallel with the said pinion shaft, a drum mounted to turn loosely on the said drum shaft, a flexible connection having one end winding and unwinding on the said drum, the said flexible connection extending around the under-side of the stairway at the free end thereof, the other end of the said flexible connection being attached to the said rest, a guide for the said flexible connection and mounted on the free end of the said arm, a manually controlled clutch on the said drum shaft and adapted to connect or disconnect the drum and the said drum shaft, and a driving gear connected with the said drum shaft and the said pinion shaft.

11. In an accommodation ladder, a platform mounted to swing transversely on one side of a vessel, a stairway mounted to swing at its upper end on one side of the platform, an arm spaced from the said platform and mounted to swing transversely on the said side of the vessel, the said arm having an angular rest for the stairway to rest on, segmental gear wheels secured on the said platform and the said arm, a pinion shaft extending lengthwise of the vessel and provided with pinions in mesh with the said segmental gear wheels, a drum shaft parallel with the said pinion shaft, a drum mounted to turn loosely on the said drum shaft, a flexible connection having one end winding and unwinding on the said drum, the said flexible connection extending around the underside of the stairway at the free end thereof, the other end of the said flexible connection being attached to the said rest, a guide for the said flexible connection and mounted on the free end of the said arm, a manually controlled clutch on the said drum shaft and adapted to connect or disconnect the drum and the said drum shaft, and a driving gear connected with the said drum shaft and the said pinion shaft, the said driving gear having a manually controlled member mounted to turn with and to slide on the said pinion shaft to connect or disconnect the latter and the drive gear.

EDWARD JAMES SIMS.