

Ships ladder

The present invention relates to a ship ladder. More specifically, this invention relates to a ship's ladder suitable for temporary use to take personnel on board the vessel from smaller vessels or pier when permanently fixed ladders are not suitable. In particular the present invention relates to
5 a pilot ladder to take a pilot on board a ship from a smaller vessel.

Background

There is a wide variety of equipment suited to help crew and guests aboard the ship. While there is a need for one type of equipment when the ship is moored and stationary docked, it is very different requirements that apply when it is necessary to take people on board ships at sea.

10 It is not practical or advisable to lower large and heavy equipment in the form of hydraulic ladders etc. that may be vulnerable to damage in heavy seas. On the other hand it is important that security is maintained, but the demands of comfort is obviously far lower with the use in special and temporary situations compared to when guests and other public are brought on board at a pier.

15 A classic pilot ladder as it still appears today, consists of steps connected using hemp rope or the like which is somewhat flexible and allows the ladder to be rolled around itself when not in use. The hemp rope, however, has a limited flexibility which means that the ladder is not compact when packed and will tend to straighten out if it is not securely tied up. In any event it requires relatively large space and is in practice more or less coiled on deck when not in use, as it is too
20 large and heavy to be packed away. This also means that it is subject to wear and deterioration caused by moisture, sunlight and other adverse effects that shorten its life-time. A special feature of the hemp rope is that it typically starts to decompose from within, probably because hemp rope quickly becomes wet when it is sprayed with water and then slowly drying from the outside so that the core of the rope will typically be wet.

25 From U.S. Patent No. 4,601,253, is known a rope ladder for marine use which shows the prior art in this field. It is foldable, but the steps are not so connected that the ladder will be stable during use, especially in high winds. It is to some extent movable, but within the boundaries of a boom from which it is suspended.

U.S. Patent No. 3,415,341 discloses a fire ladder. It is foldable and stable due to the fact that it has
30 fastening points near the step corners. It has, however, no mechanism for being lowered nicely and slowly from above. It must either be released in its entirety at once, or the user must release it gradually, by changing grip from step to step until the entire ladder is out. The ropes - one near each corner - are attached to the steps of one form of clamps and crimping, see column 3, line 62-

63, and the ropes must be manually and carefully folded in between the steps when the ladder is to be packed away.

CA Patent No. 2,110,206 discloses a fire ladder or ladder for general purposes that is foldable, but which lacks features that are important for a ladder for maritime use. It lacks a.o. a recess for hands to ensure a squeeze-free zone for hands. A characteristic with this ladder is that it comprises an integrated unit in the form of a crank housing and an attachment device requiring a thereto adapted attachment point on the building or structure to which it shall be attached, so that the crank housing is kept at a correct, about 90 degrees, angle relative to wall surface. The complex structure of crank housing and crank to wind the steps up and down, makes the unit generally non-versatile and not well suited for maritime use, especially not unless all parts of the crank housing are made in expensive stainless steel materials.

Objects

It is an object of the present invention to provide a ship's ladder for use in situations where vessels are not located alongside a pier, but is undocked at sea, such as to bring up a pilot or other personnel from a small vessel, life raft or the like, where safety of the personnel and ease of use are ensured in a good way.

It is a further object to do this with equipment which is suitable for long term use in harsh climatic conditions, such as strongly varying temperature, humidity, wind and problems related to icing.

It is a further object to achieve this with equipment that is lightweight and easy to handle even for a single person.

The present invention

The objectives listed above are met by the ship's ladder of the present invention as defined by claim 1. Preferred embodiments of the invention are disclosed in the dependent claims.

Further details on the ship's ladder of the present invention are given with reference to the enclosed drawings.

Figure 1 shows part of a ship's ladder according to the present invention in a state ready for use.

Figure 2b shows an alternative variant of a single step of a ship's ladder of the present invention.

Figure 3 shows the ship's ladder of Figure 1 in a partially retracted position.

Figure 1 shows a part of an embodiment of a ship's ladder of the present invention in a position ready for use. The ship's ladder comprises steps 11 which are held by flexible suspension elements 12 (four in Figure 1) attached to each step 11 at attachment points 13. The attachment points typically include a bracket and one or more screws. It is worth emphasizing that the flexible

suspension elements 12 (hereinafter also called bands) can be released from the steps so that individual steps 11 can be replaced if they are damaged, and so that the flexible bands 12 can be replaced if they start to crack up or become brittle.

5 A cord 14 passes through each step 11 in the vertical bore 15 through the steps near each short side, that is near the flexible band 12. On the right side of the ladder in Figure 1, the cord 14 is shown with dotted lines because it is hidden behind one of the flexible bands 12. There may be used a cord 14 to each side of the ladder, but it is most convenient that a single cord runs down on one side of the ladder and back up the other side of the ladder as shown in Figure 3 and 4. The cord 14 is used for lowering out and hoisting of the ladder while also folding the ladder as
10 described below.

Figure 1 also shows that each step 11 may be provided with stabilizing struts 16 extending laterally from the respective struts. With a given length of these struts 16 it is ensure that the ladder does not rotate around its axis even if there are some winds when it is lowered and before it carries any weight. The struts 16 may have end pieces in the form of small rollers 17 or the like, arranged to
15 roll along the hull when the ladder is lowered or hoisted. Some steps or every step 11 have bores on their end sides (short sides) for receiving such stabilizing struts.

Figure 2a shows a step 11 from above. The step has short sides to the right and to the left at which the attachment points 13 for the flexible band are indicated. As seen in Figure 2a, the attachment points 13 on both short sides 21 are positioned near the front corners 24 and rear corners 25
20 respectively, of the step. The greater the distance between the attachment points, the more stable the step will be against tilting when a weight is placed upon it. A lot of weight would typically be placed near the free, straight edge 20 facing away from the hull of the ship when a person climbs the ladder. The fact that there are at least two attachment points 13 of the flexible band 12 at each side of each step 11 is essential to ensure that the steps are stable during use, significantly
25 more stable than the steps on a traditional pilot ladder in which the steps are held by a rope at each side. To place the (at least) two attachment points at a considerable distance from each other and preferably close to each corner of steps, further contributes to the desired stability.

At the long side arranged to face the side of the ship, there is a recess 22 in each step allowing the user to grip around step without risking having the fingers squeezed, since the step will rest
30 against the ship's side by the shoulders 23. The user can of course also hold on to the flexible bands 12 when he enters the ship's ladder of the present invention. The steps 11 can be provided with any pattern or grooves and any surface coatings to increase friction and grip friendliness. They can be made of any material but is preferably castes in a synthetic material which is

appropriate on the basis of characteristics such as friction, resistance to sun light, abrasion resistance, strength at low temperatures, etc.

Figure 2b shows an alternative form of a step 11 from above. The difference from the variant shown in Figure 2a is that the step has three shoulders 23 adapted to abut against the ship's side when in use and that the central shoulder 23 has a bore 15 for letting the string 14 there through. The central shoulder 23 divides recess 22 in two. The main difference in practice is that the central location of the cord 14 allows it to only be led through the steps once, from top to bottom. The cord 14 may be attached to the lower step 11 or provided with an extension which prevents it from slipping through the bore 15 in the lowermost step.

Figure 3 shows the ship's ladder of the present invention in a position where it is hoisted almost to the top. By pulling each end of the cord 14, first the bottom step is lifted up to the adjacent step above while each of the flexible bands between the two steps folds out into a loop. Then these two steps are lifted in unison until contact occurs between step 2 and step 3 from the bottom. At the same time the flexible bands between step 2 and step 3 are folded. This continues until the entire ladder is hoisted up and all steps are stacked closely together and take up a minimum of space. As shown in Figure 3, all steps are pulled into contact with one another except the last / uppermost one. When the ladder finally is up, it is lifted over the rail and attachment devices 18 to which the flexible bands are terminated can be released. The ship's ladder can then be placed in a special box that does not take up much space on deck. In such a box the ladder is protected from the surrounding environment, including protected from sunlight and any danger of icing in winter.

A box mentioned above can be fixed or arranged removably, allowing it to be moved along the ship railing. If the box is fixedly secured to the deck or to other fixed equipment on the ship, then the attachment device 18 that terminates the flexible band can be fixedly attached in the box, thus eliminating the need to attach it when the ladder shall be lowered. The attachment device 18 can have any suitable shape. The open brackets (inverted "U") shown in Figure 3 may be useful as fastening means when the ship's ladder is free and adapted to be moved on board the ship, while plates and screws, etc. may be used if the ship's ladder shall be permanently affixed within or outside a box.

The cord or cords 14 must have sufficient length to lower the whole ladder. As shown in Figure 3, there are loose cord ends over the uppermost step of the ladder on both sides. However, it is an option that the cord is attached to the top step of the ladder on one side, and that lowering and hoisting the ladder is performed with the loose cord end.

Deployment of the ship's ladder according to the present invention occurs in a manner opposite to the hoisting of it. Unless the upper end of the flexible bands 12 are permanently attached, they are to be attached to the ship, such as rail, using specially arranged attachment devices 18.

5 Stabilizing struts 16 are attached to some of the steps 11, intended for this, unless the weather allows deliberately omitting stabilizing struts. Then the ladder in its stacked condition is carefully lifted over the rail with the correct side facing the ship hull, while simultaneously holding on to one or both ends of the cords 14, depending on whether one or both of the ends are loose.

Alternatively, the cord may be provided with knot or lock until the ladder is placed over the rail, so as to ensure that the ladder does not fall out uncontrollably with the risk of possibly hurting
10 someone. Then the ladder is lowered down as far as required by letting out sufficient length of cord 14. If it can be done in the case at hand, the lowering is stopped before the lower part of the ladder reaches the water surface. The cord 14 is ensured with good knot or otherwise to prevent the cord end(s) from being pulled through the uppermost step.

While the figures show two flexible bands 12 at each short side of the steps 11, which represents a
15 preferred embodiment, it is possible to use several, such as three flexible bands 12 at each side. It is also possible to use only one flexible band 12 at each short side of the steps 11, with the additional requirement that this band in that case should have a width sufficient to allow two attachment points for each step 11 through the same band.

As will be understood from the explanation above, the ship's ladder stable in use, primarily due to
20 the (at least) two attachment points for the flexible suspension bands 12 at each side of each step. Furthermore it requires extremely small space when it has been pulled in and the steps abut against each other. The flexible bands, typically made in a synthetic material, such as polyamide, optionally fiber-reinforced and provided with UV filter for better withstand sunlight, are sufficiently flexible to be folded double when the ladder is hoisted in, and can be even further
25 folded along the sides of the ladder if the ladder is placed in particularly arranged box. In any case they only extend with a distance barely half the height between two steps in the ladder's ready to use position.

The individual parts of the ladder of the present invention can be replaced in case of damage or wear. Thus, for example, the flexible strip 12 may be replaced without discarding any steps, or
30 individual steps 11 may be replaced in the event of damage to them. Naturally, also the cord 14 may be replaced separately if the need should arise.

Thus it is clear that the object of the present invention is fulfilled by ship's ladder according to the present invention.

Claims

1. Ship's ladder comprising rigid steps (11) connected by flexible suspension elements (12),
characterized in that at both short sides of each step (11) there are at least two attachment points
5 (13) for the flexible suspension elements (12) and that the steps comprises borings penetrated by
a cord (14) arranged to lower and hoist the ladder.
2. Ship's ladder as claimed in claim 1, **characterized in** that the ladder comprises four flexible
suspension elements (12), one attached to the short side (21) near each of the foremost corners
(24) of each step (11) and one attached to the short side (21) near each rear corner (25) of each
10 step (11).
3. Ship's ladder as claimed in claim 1, **characterized in** that each step (11) exhibit two borings (15),
one near each short side (21), a cord (14) for lowering and hoisting the ladder passing though both
said borings (15) of the steps (11).
4. Ship's ladder as claimed in claim 1, **characterized in** that each step (11) exhibits a boring (15)
15 through a shoulder (23) of the step (11), said shoulder being localized substantially mid between
the short sides (21), a cord (14) for lowering and hoisting the ladder passing through said borings
(15) of the steps (11).
5. Ship's ladder as claimed in claim 1, **characterized in** that the flexible suspension elements (12)
are in the shape of bands manufactured in a synthetic material.
- 20 6. Ship's ladder as claimed in claim 5, **characterized in** that the synthetic material is chosen among
polyamide, fibre reinforced polyamide, copolymers of compounds comprising polyamide and
composite materials comprising polyamide.
7. Ship's ladder as claimed in claim 1, **characterized in** that each step (11) exhibits at least one
recess (22) in the side arranged to face the ship's hull, and shoulders (23) arranged to rest against
25 the ship's hull.
8. Ship's ladder as claimed in claim 1, **characterized in** that it comprises stabilizing struts (16) and
that at least some of the steps exhibit borings into their short sides for receiving such stabilizing
struts.

9. Ship's ladder as claimed in claim 8, **characterized in** that the ladder comprises at least four stabilizing struts arranged for attachment to at least very 9th step, preferably attached by means of spring assisted bayonet socket in the borings.
10. Ship's ladder as claimed in claim 1, **characterized in** that the top of the ladder is arranged for permanent or temporary attachment to the ships rail or deck.
11. . Ship's ladder as claimed in claim 1, **characterized in** that the separate steps (11) are made in a synthetic material and preferably provided with a groove pattern at least in the surfaces arranged to face upwards.
12. Ship's ladder as claimed in claim 7, **characterized in** that the separate steps (11) are provided with a grip friendly groove at the bottom side, inside the recess (22) arranged to face against the ship's hull.
13. Ship's ladder as claimed in any ones of claims 1-12, **characterized in** that the flexible suspension elements (12) are sufficiently flexible to allow each step (11) to contact any adjacent step when the ship's ladder is hoisted by means of the cord (14).
14. Ship's ladder as claimed in any ones of claims 1-12, **characterized in** that it comprises or is adapted to a storage container protecting it from the external environment when not in use.