May 19, 1970 L. C. HUNTLEY 3,512,608

LADDER STRUCTURE

Filed May 6, 1968

Fig. 1

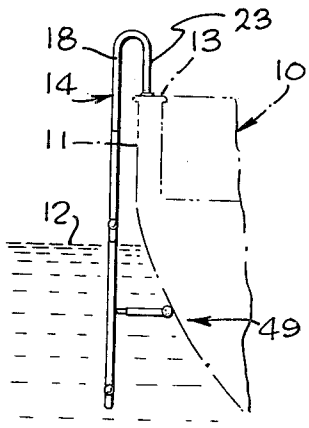


Fig. 2

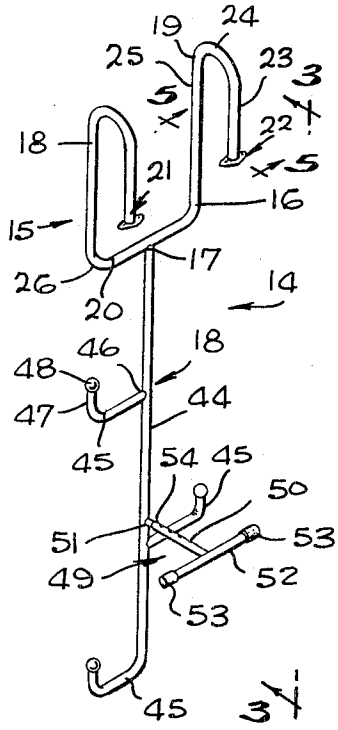


Fig. 3

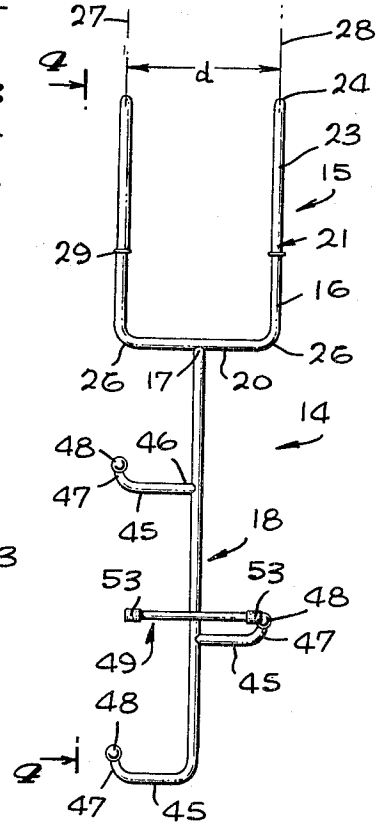


Fig. 4

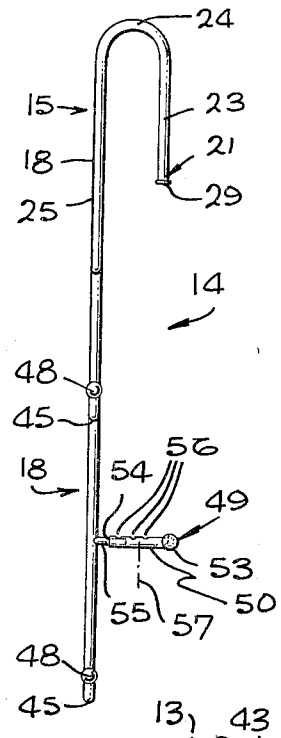


Fig. 5

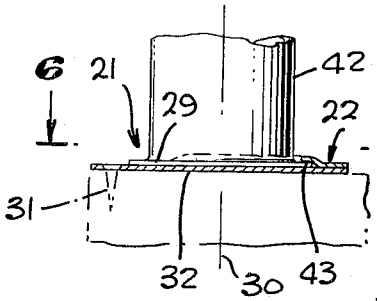


Fig. 6

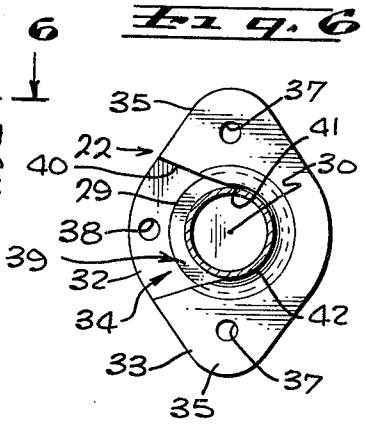
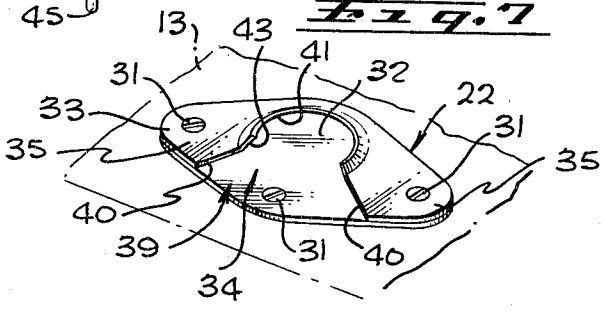


Fig. 7



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LADDER STRUCTURE

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U.S. Cl. 182—93 11 Claims

ABSTRACT OF THE DISCLOSURE

A ladder for climbing upwardly at the side of a boat or the like, and having an upper portion adapted to be hooked over the edge of the boat and forming two spaced grab rails, with a vertical post extending downwardly from and suspended by the upper portion of the ladder and having steps projecting in opposite directions from the post. The two grab rails are desirably of inverted U-shaped configuration, having first ends detachably connectible to the boat, and having second ends interconnected by a cross piece forming an additional step, from the center of which the mentioned post is suspended. The ladder is connected to the boat by brackets to which the ladder is connectible by movement horizontally relative to the brackets.

BACKGROUND OF THE INVENTION

This invention relates to a unique ladder for climbing upwardly at the side of a support structure, and over an upper edge of that structure, and in certain respects especially adapted for use as a boat ladder.

Though various types of ladders have been devised in the past for use in climbing onto or off of a boat, all of those with which I am familiar have had certain definite disadvantages. For example, many of these ladders have been formed of a material such as aluminum, wood, or the like, which is subject to rapid deterioration in marine used, by reason of the adverse effect of water, particularly salt water, on these materials. Further, the construction of these prior ladders has been such as to preclude the use of stainless steel or other corrosion resistant materials in their manufacture, because of the amount of material required in making the ladder, and the difficulty of forming the material to the desired shapes.

SUMMARY OF THE INVENTION

A ladder formed in accordance with the present invention is so constructed as to overcome the above disadvantages of prior ladders, and in particular to enable formation of the ladder of so little material, and with such ease of manufacture, that a relatively expensive material may be employed. Preferably, a ladder embodying the invention is formed of a high grade of stainless steel, desirably in the form of conventional tubing, bent and assembled in a highly unique manner.

Structurally the ladder includes an upper portion forming two grab rails to be grasped by the two hands of a user in climbing upwardly or downwardly at the side of a boat, with a lower portion being suspended by the upper portion and consisting of a single vertical post having steps projecting in opposite directions therefrom. The upper end of the post may be secured to and suspended from an additional step interconnecting and extending between the lower ends of the two grab rails, with opposite ends of the grab rails being connectible to the boat by appropriate brackets.

Certain specific features of the invention relate to the preferred construction of these brackets. As will appear, these brackets are desirably so formed as to enable very easy and rapid attachment of the ladder to the boat, and detachment therefrom, by simple horizontal motion of

the ends of the tubing forming the grab rails relative to the brackets.

BRIEF DESCRIPTION OF THE DRAWING

The above and other features and objects of the invention will be better understood from the following detailed description of the typical embodiment illustrated in the accompanying drawing, in which:

FIG. 1 is a side view of the ladder, showing it as it appears when in use and attached to the side of a boat;

FIG. 2 is an enlarged perspective view of the ladder;

FIG. 3 is a full elevational view of the ladder, taken on line 3—3 of FIG. 2;

FIG. 4 is a side elevational view taken on line 4—4 of FIG. 3;

FIG. 5 is an enlarged fragmentary vertical section through one of the bracket mounting arrangements, and taken through the bracket and the ladder end on the line 5—5 of FIG. 2;

FIG. 6 is a plan view taken on line 6—6 of FIG. 5; and

FIG. 7 is a perspective view of the bracket.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring first to FIG. 1, I have shown diagramatically at 10 a small boat whose outer surface 11 extends upwardly above the water level 12 to a top edge or gunwhale of the boat. A ladder 14 constructed in accordance with the invention is attached to the boat in a position for use by a person in climbing upwardly at the side of the boat, either from a position within the water or from an adjacent dock or the like. The ladder is supported from the boat by having the upper end of the ladder hooked over the gunwhale in a manner illustrated in FIG. 1.

With reference now to FIG. 2, the ladder may be considered as having an upper portion 15 preferably formed of a single elongated piece of metal tubing 16, and connected at 17, preferably by heliarc welding, to a lower portion 18 of the ladder. More particularly, the upper portion 15 of the ladder desirably forms two identical horizontally spaced and parallel grab rail elements 18 and 19 interconnected at their lower or outer ends by a horizontal cross piece 20 forming an upper step of the ladder. The two grab rails 18 and 19 are of inverted U-shaped configuration (see FIGS. 1 and 4), each having an end 21 which faces downwardly and is detachably connectible by a coacting bracket 22 to the gunwale 11 of the boat. These inverted U-shaped grab rail elements 18 and 19 first extend directly vertically upwardly from their extremities 21, as indicated at 23, and then have return bend portions 24 which curve outwardly with respect to the boat and then extend directly vertically downwardly at 25 to the second ends 26 of the U-shaped elements. At these ends 26, the U-shaped elements are connected to opposite ends of the cross piece 20, preferably by formation integrally therewith. That is, the tubular material forming the inverted U-shaped grab rail elements 18 and 19 may merely be curved through 90 degrees at the locations 26 to merge with and form the horizontal cross piece 20, so that the entire upper grab rail and cross piece combination forming the upper portion 15 of the ladder is formed, as previously indicated, from a single elongated length of tubing. As seen in FIG. 3, the two U-shaped grab rail portions 18 and 19 desirably lie within two parallel vertical planes 27 and 28, and are spaced apart a distance d wide enough to enable a person to climp upwardly between the grab rails. For best results, the distance d between the grab rails should be between about 12 and 15 inches.

At their attachment ends **21**, the grab rails are flared radially outwardly to form annular generally horizontally projecting flanges **29** disposed essentially transversely of the vertical axes **30** of portions **23** of the ladder. These flanges are slidably receivable in interfitting engagement with the two attaching brackets **22**, which are secured by screws **31** to the horizontal upper surface of the gunwale or upper edge **13** of the boat. Each bracket **22** is desirably formed of a lower planar horizontally extending piece of sheet metal **32** and a second and upper horizontally extending piece of sheet metal **33** brazed, welded, or otherwise secured to the upper surface of element **32**. These two parts **32** and **33** have the same peripheral outline configuration, as seen in FIG. 6, except insofar as the upper part **33** is interrupted for reception of one of the tubing flanges **29**. More particularly, the outline shape of parts **32** and **33** is such as to provide a central area **34** for reception of the tubing flange, with two ears **35** projecting in opposite direction therefrom for reception of two of the screws **31** in positions of extension downwardly through openings **37** in the two parts **32** and **33**, so that the screws may connect into gunwale **13** for rigidly securing the bracket thereto. An additional opening **38** may be provided in the forward portion of lower part **32** of the bracket, to further assure rigid attachment of the bracket to the gunwale, and to thereby hold the ladder rigidly in place.

As seen best in FIGS. 6 and 7, the upper part **33** of the bracket is cut away at its forward side to provide a throat **39** into which the flange **29** of one of the tubing portions **23** is horizontally slidable. This throat **39** is defined by two opposite side edges **40** of part **33**, which converge rearwardly to the location of an essentially semicircular opening or edge **41** formed in and by the material of upper part **33** of the bracket. This edge **41** is curved circularly about axis **30** at a diameter slightly greater than the diameter of outer surface **42** of tubing portions **23**. Adjacent edge **41**, the material of upper part **33** of the bracket is turned angularly upwardly into vertically spaced relation with respect to the upper horizontal planar surface of bottom part **32** of the bracket, to form with that bracket a circularly extending guideway **43** (FIGS. 5, 6, and 7) of a size to closely receive and confine flange **29** of the ladder. The opening at the forward side of this guideway is wide enough to enable the ladder end to be slid horizontally (to the right in FIG. 5) into the guideway, and to then be frictionally retained within the guideway, in the position of FIGS. 5 and 6, until forcibly displaced horizontally therefrom. As seen in FIG. 6, the guideway **43** desirably extends very slightly more than 180 degrees about axis **30**, but the external dimension of flange **29** is small enough to enable that flange to be slid into the guideway in spite of the fact that the ladder does extend slightly more than half way around the axis. The material of the parts **32** and **33** is sufficiently rigid to retain the illustrated configuration and thereby effectively receive and hold the ladder. Preferably, the two rigidly connected parts **32** and **33** of the bracket are formed of stainless steel, of a thickness giving the bracket the desired rigidity.

The lower portion **18** of the ladder includes a vertically extending post **44**, preferably formed of the same type and diameter of tubing of which upper portion **15** is made, with the upper end of post **44** being rigidly attached at **17** to the center of the cross piece or step **20**. This connection may be made by heliarc welding the upper end of the post to the center of the cross piece. At a series of vertically spaced locations, post **42** carries a number of laterally projecting steps **45**, with alternate ones of the steps projecting in opposite horizontal directions, and with the inner ends **46** of the steps heliarc welded or otherwise rigidly secured at post **44**. The steps may be formed of rigid metal tubing, which extends first horizontally outwardly from and perpendicular to post **44**, and parallel to cross piece **20**, and is then turned upwardly at **47** to form an outer end of the step. At its extremity the step may carry a cap or plug element **48** formed of an appropriate metal or resinous plastic material or the like. The lowermost one of the steps **45** may project outwardly from the very bottom of post **44**.

At a point above the lower end of post **44**, this post carries a spacer member **49**, for engaging the boat and maintaining the rest of the ladder in spaced relation thereto. This member **49** may be of T-shaped horizontal configuration, having a member **50** secured rigidly at **51** to and projecting perpendicularly from post **44**, and having a horizontal cross piece **52** at its extremity carrying rubber caps **53**, or other suitable cushioning material, adapted to engage the side of the boat in a cushioned relation. The member **50** of spacer **49** lies in a vertical plane which is midway between and parallel to the two vertical planes **27** and **28** of FIG. 3, with the enlargement or cross piece **52** of the spacer extending perpendicular to all of these planes, but parallel to the horizontal portions of the various steps **20** and **45**. Portions **50** and **52** of the spacer may, like most of the other portions of the ladder, be formed of rigid metal tubing, with all of the tubing, as previously indicated, desirably being formed of an appropriate highly corrosion resistant stainless steel.

In using the ladder, it may be very easily connected to the side of a boat in the FIG. 1 condition, by merely positioning the flanges **29** of the two portions **23** of the ladder on the upper surfaces of the two brackets, and then sliding those flanges horizontally along the upper surfaces of parts **32** of the brackets, and into confined relation within the two approximately semi-circular guideways **43**. The flanges will be frictionally retained within the guideways by virtue of their tight fit therein, with the weight of the ladder being effectively supported on the gunwale. A person may then climb upwardly from the water, or from an adjacent dock, by using the steps **45**, and the upper step **20**, and grasping the grab rails **18** and **19**. When the ladder is to be taken out of use, the flanges or flared portions **29** of the tubing may easily be slid horizontally out of their positions of confinement within the brackets, to free the ladder from the brackets so that it may be pulled upwardly into the boat.

At the time of initial sale of the above discussed ladder to a purchaser, the ladder may be so designed as to enable alteration of the horizontal length of tubular element **50** of the spacer **49**, in order to adapt the ladder for use with a particular boat, that is, so that the post **44** may be maintained in a directly vertical position when the spacer **49** is in engagement with the side of the boat. For this purpose, tube **50** may initially be formed of a predetermined maximum usable length, and be adapted to be cut off transversely at different locations along its length to reduce the effective spacing length of the tube. The inner end **54** of tube **50** (see FIGS. 2 and 4) may be secured to vertical post **44** by telescopic reception about a short connector post **55** which is welded or otherwise secured to post **44** and projects horizontally therefrom. To form a tight mechanical connection between tube **50** and post **55**, the tube **50** may have a series of localized depressions or indentations **56** formed in its side wall at spaced locations along the length of the tube, so that the radially inwardly deformed material at these indentations is tightly frictionally engageable with the outer surface of post **55** in a manner securing tube **50** on the post in fixed relation thereto after the tube has been forced thereon. When the desired length for tube **50** has been determined, the tube may be cut off transversely at any location between a pair of the indentations **56**, as for instance in the vertical plane **57** of FIG. 4, following which the remaining shortened portion of the tube may be forced onto post **55** so that the next one of the indentations **56** will tightly engage the post and form a tight rigid connection between the spacer and the post.

I claim:

1. A ladder for use in climbing upwardly at a side of a support structure and over an edge thereof; comprising an upper portion of the ladder adapted to be hooked over said edge of the support structure and be suspended thereby, said upper portion having two grab rails spaced laterally apart to be grasped by the two hands of a user in climbing upwardly, a vertical post connected at its upper end to and suspended by said upper portion of the ladder and extending downwardly therefrom at a location to be received at said side of the support structure, steps projecting in opposite directions from said post to be engaged by the feet of a user at said opposite sides of the post in climbing upwardly, and interfitting connectors on said upper portion of the ladder and said support structure and movable into interfitting relation by relative horizontal movement to connect the ladder to said structure.

2. A ladder for use in climbing upwardly at a side of a support structure and over an edge thereof; comprising an upper portion of the ladder adapted to be hooked over said edge of the support structure and be suspended thereby, said upper portion including a step and having two grab rails spaced laterally apart to be grasped by the two hands of a user in climbing upwardly, a vertical post connected to and suspended by said step of said upper portion of the ladder and extending downwardly therefrom at a location to be received at said side of the support structure, and additional steps projecting in opposite directions from said post at locations beneath said first mentioned step to be engaged by the feet of a user at said opposite sides of the post in climbing upwardly.

3. A ladder as recited in claim 2, in which said upper portion of the ladder includes two laterally spaced elongated elements of generally inverted U-shaped configuration and forming said two grab rails, said first mentioned step extending between and being attached at opposite ends to said U-shaped elements, said post being connected at its upper end to said first mentioned step at a location intermediate said opposite ends thereof.

4. A ladder as recited in claim 2, in which said upper portion of the ladder includes two laterally spaced elongated elements of generally inverted U-shaped configuration and forming said two grab rails, said two elongated elements having first ends by which they are supported from said edge of the support structure and having second and lower ends to be received at said outer side of said support structure, two brackets to be mounted to said edge of the support structure at spaced locations, means at said first ends of the elongated elements detachably connectible to said brackets respectively, said upper portion

of the ladder having a horizontally extending cross piece forming said first mentioned step extending between and connected at its opposite ends to said second ends of said U-shaped elements, said post being connected near its upper end to a generally central portion of said first mentioned step and projecting downwardly therefrom.

5. A ladder as recited in claim 4, in which said upper portion of the ladder is formed of a single elongated piece of tubing bent to form said two U-shaped elements and said cross piece therefrom.

6. A ladder as recited in claim 4, including a spacing member projecting from said post and having an enlarged and cushioned end engageable with said structure to space said post therefrom.

7. A ladder as recited in claim 2, in which said upper portion of the ladder includes two laterally spaced elongated elements of generally inverted U-shaped configuration and forming said two grab rails.

8. A ladder as recited in claim 2, in which said upper portion of the ladder includes two laterally spaced elongated elements of generally inverted U-shaped configuration and forming said two grab rails, said two elongated elements having first ends by which they are supported from said edge of the support structure and having second ends connected to opposite ends of said first mentioned step.

9. A ladder as recited in claim 2, including connector means for securing said grab rails to said support structure.

10. A ladder as recited in claim 2, including two sets of interfitting connectors to be carried by said support structure and said grab rails for detachably securing said grab rails to the support structure.

11. A ladder as recited in claim 2, including a spacing member projecting from said post at a location to engage said side of the support structure and hold the post in outwardly spaced relation thereto.

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U.S. Cl. X.R.

182—206, 106, 189