Aug. 30, 1966 F. J. LUKETA 3,268,996

TRAWL WINCH MOUNTING ADJUSTING METHOD

Original Filed Dec. 31, 1962 2 Sheets-Sheet 1

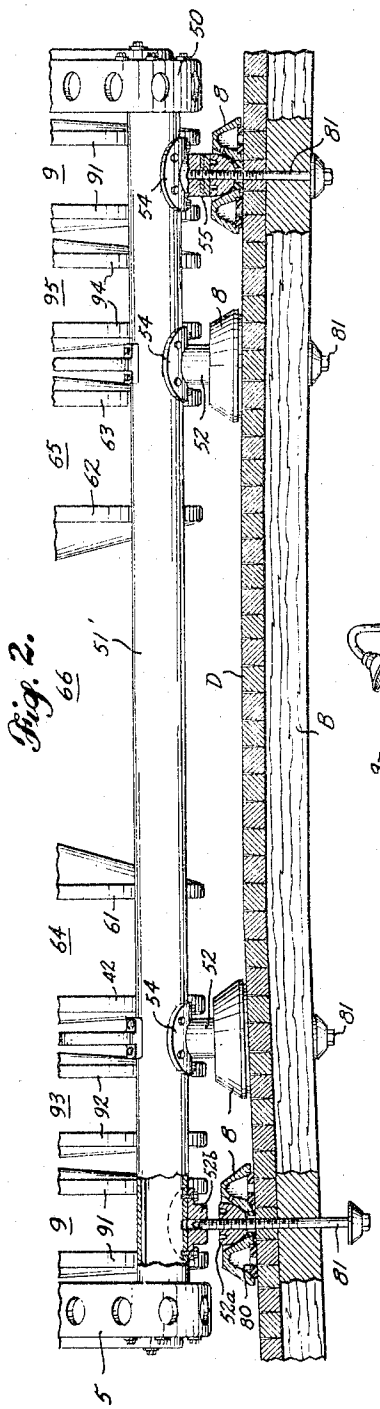


Fig. 2.

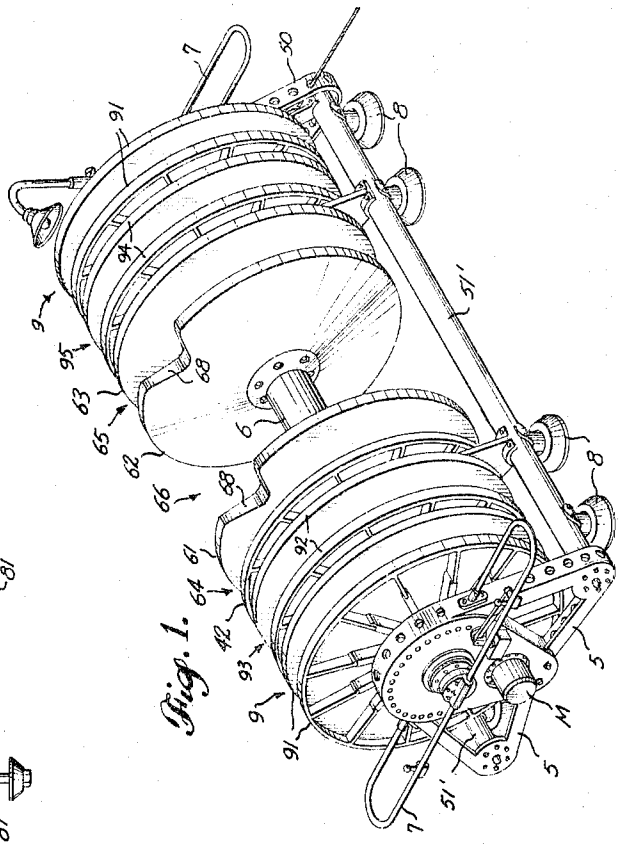


Fig. 1.

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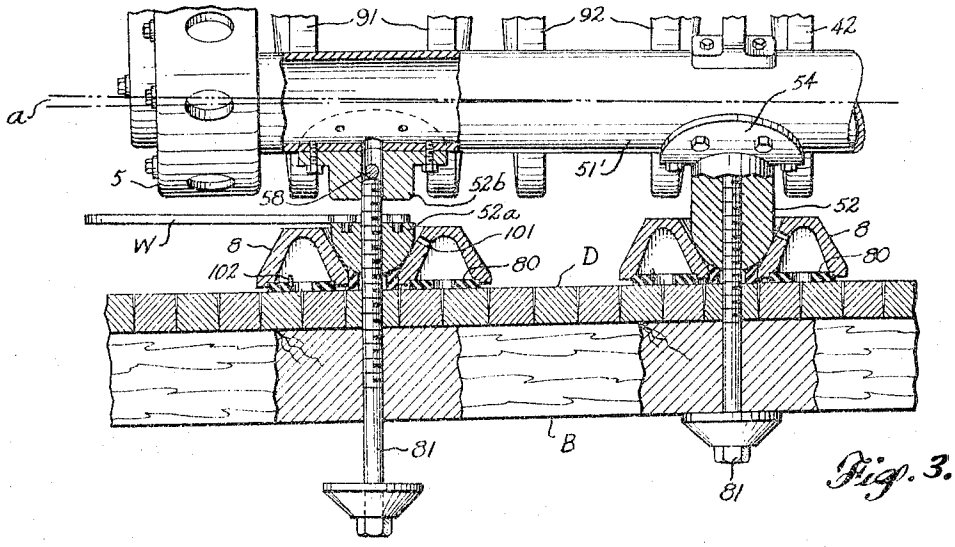


Fig. 3.

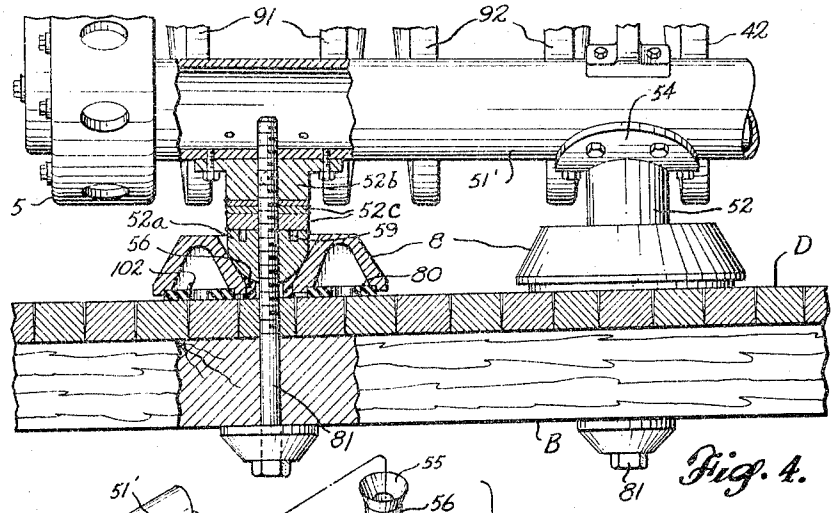


Fig. 4.

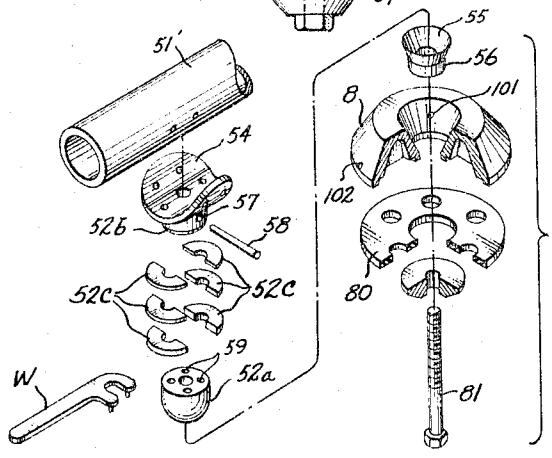


Fig. 5.

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United States Patent Office 3,268,996 Patented August 30, 1966

3,268,996

TRAWL WINCH MOUNTING ADJUSTING METHOD

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Original application Dec. 31, 1962, Ser. No. 248,452. Divided and this application July 14, 1965, Ser. No. 471,991

1 Claim. (Cl. 29—407)

This application is a division of my patent application Serial No. 248,452 filed December 31, 1962 for Trawl Winch Mounting, which is a continuation-in-part of my patent application Serial No. 836,636 for Winch for Hauling Trawl Nets, filed August 28, 1959, now abandoned. The winch of that patent application was devised particularly to haul and receive a special type of trawl in which unstressed curtains diverge forwardly from the body of the trawl which are of a length many times the length of the wings of standard trawls. Such a winch may also have outer drums independently rotatable for independant handling of trawl lines, or other lines. The winch mounting adjusting method of the present invention is particularly suitable for mounting various types of trawl winch on ship decks, but it is also useful for mounting winches of other types on a sloping deck, or other uneven or inclined surface.

The mounting of a winch upon the crowned or sloping deck of vessel is ordinarily a difficult and time-consuming operation. Such a winch will exert and be subjected to a heavy pull, which at times may be in a direction other than perpendicular to the rotative axis of the winch drum, so that the force of such pull will tend to wrack the winch and its frame, and perhaps to exert unequal loads on the various anchors of the winch. It is necessary to secure such a winch to the ship's deck very securely without creating leaks in the deck and it is desirable for the winch thus to be mounted without requiring attention, or adjustment, throughout the useful life of the winch. The problem is particularly difficult when it is desired to set and maintain the alignment of the drum bearings accurately, although the winch is mounted on a sloping deck, and even though it may be desired to secure the winch to the deck at more than four anchor points.

In mounting a winch on the deck of a ship it is an object to support the winch on pads which rest on the deck, but which are not directly anchored to the deck but are held in place by anchoring of the winch feet directly to the deck, and to anchor such feet securely to the structure of the vessel.

Another object is to provide a procedure and structure which will enable the supporting feet and the pads engaged thereby to be located quickly and easily in proper locations on the ship's deck for supporting the winch. Particularly it is an object to support such a winch having any number of support feet, so that the winch frame and drum support will be aligned accurately and the weight of the winch will be substantially uniformly distributed over all of the supports.

A further object is to enable the weight carried by each supporting foot to be transmitted to the foot supporting structure uniformly irrespective of the degree, or direction, in which the deck beneath such foot slops, and to enable such uniform stress distribution to be maintained without periodic adjustment of the parts being required.

It will be understood that the principle of the present winch mounting adjusting method can be applied to winches of other types and, in fact, to equipment of other types where a comparable mounting problem is involved.

In general, each mounting foot has a ball-shaped end engaged in a conical socket in a deck pad for relative universal tilting movement and secured by an anchor bolt extending through the deck and preferably also through a deck beam. Such anchor bolt may cooperate with a two-part foot to product a jacking force for adjusting the height of a winch anchor point, and fillers may be inserted between the two parts of the foot and secured in place to effect proper alignment of the winch frame and drum supporting structure.

FIGURE 1 is a top perspective of a representative type of winch, installation of which may utilize the winch mounting adjusting method of the present invention, and FIGURE 2 is a side elevation of a portion of such winch showing its mounting utilizing such method on an enlarged scale with two of the winch anchoring foot units being shown in vertical section.

FIGURE 3 is a vertical section through winch-anchoring foot units on a scale larger than FIGURE 2, and illustrating two different types of winch-anchoring foot units, and FIGURE 4 is a similar view with one of the anchoring foot units being shown in elevation and the other anchoring foot unit being shown in a condition different from that illustrated in FIGURE 3.

FIGURE 5 is a top perspective of a winch foot-anchoring unit such as shown in FIGURES 2, 3 and 4, with parts shown in exploded relationship, and portions being broken away.

Winches of the type shown in FIGURE 1 are mounted on the after or amidships deck of a trawler, and the deck D and deck beams B to which the winch is anchored are shown in various figures. The port and starboard winch end frames **5** and **50** of the winch shown in FIGURE 1 are of generally triangular profile and formed of members of angle cross section. The lower apexes of the winch end frames are connected by struts **51'** to which the winch-anchoring foot units are attached.

In general, the winch shown in FIGURE 1 includes a winch drum **6** on which are mounted intermediate flanges **61** and **62** between flanges **42** and **63**, which are also secured to the winch drum. The flange **42** and the adjacent intermediate flange **61** define the side reel **64** between them, the flange **63** and the intermediate flange **62** define the side reel **65** between them and the two intermediate flanges **61** and **62** define the central reel **66** between them.

Each of the intermediate flanges **61** and **62** has axially aligned edge notches **68** through which transition sections of the trawl adjacent to the junction of the curtains with the trawl body may pass, so that after the curtains have been wound on the two side reels **64** and **65**, respectively, the body and cod end of the trawl can be wound upon the central reel **66**. The entire drum may be rotated by a motor M carried by the end frame **5** which is controlled by one or the other of the control knobs **21** and **21***a*, which are mounted on and slidable along a guard rail **7**. The motor can be a hydraulic motor or an electric motor, as may be preferred.

In addition to the flanges **42** and **63** and the intermediate flanges **61** and **62** forming the reels **64**, **65** and **66**, additional flanges **91** are located adjacent to the end frames **5** and **50**, respectively. These flanges are located in spaced relationship, as shown in FIGURES 1 and 2, and are carried by winch drums independent of the winch drum **6** to form reels **9** at each end of the winch for the two opposite warps or towing lines for towing the trawl. These drums are operable independently of each other and of all other reels of the winch to enable the trawl to be controlled as desired. Also, nearer the end frame **5** flanges **92**, carried by a separate winch drum, are interposed between the trawl towing line reel **9** and the reel **64** to define a reel **93** on which a try net may be wound. Also, between the reel **65** and the reel **9** adjacent to the end plate **50** flanges **94** may be provided, which are mounted on a separate winch drum to define an in-

dependent reel **95** for a utility lifting line running through a block on a boom overhead.

At each corner of a winch such as shown in FIGURE 1 and of a winch such as shown in FIGURE 5, the struts **51'** are supported by anchoring foot units. These struts **51'** are also supported between the corners of the winch by intermediate anchoring foot units to prevent bending of such struts and misalignment of the several winch reels. It is important that whatever the length and width of the winch, such winch be supported in stable fashion so that it will not tend to tilt, or its frame be twisted, or the winch sag from end to end, or a combination of these characteristics occur. It is particularly difficult to prevent the occurrence of all of these characteristics when a winch is to be mounted on a sloping deck and it is desired that the direction of pull be along a particular predetermined line. The winch mounting adjusting method of the present invention enables all of such characteristics to be avoided, while at the same time enabling the winch to be installed quickly and easily.

First, it is important that when installed the winch will have its bearing points located in positions overlying deck beams B, as shown in FIGURES 2, 3 and 4, instead of simply resting indiscriminately on the decking. Such location of the bearing points will also enable the winch to be tied down securely to the deck beams when the winch is installed, instead of being anchored only to the decking. Also, it is preferred that, despite any slope which the deck may have, the eight bearing points on the deck coincide with the eight feet of the winch shown in FIGURE 1, although this is not necessary. If such bearing points on the deck are in coplanar relationship, however, the winch can be supported by feet **52** of nonadjustable character. To perform the method of the present invention adjustable feet having upper and lower relatively displaceable parts are required. The lower end of each of these feet is rounded, preferably of hemispherical shape, to constitute a ball element and the upper end of each foot carries an integral saddle **54** having a cylindrically concave surface of a curvature complemental to the curvature of the strut **51'**, and receiving such strut. Such saddle of each foot is secured to a strut **51'** in the proper position lengthwise of it by several machine bolts which are screwed into holes drilled and tapped in the strut.

When the winch has been set the ball ends of the feet **52** or the lower foot portions **52***a* will be received in sockets, preferably of frusto-conical shape, in deck pads **8**, which rest on gaskets **80** on the deck D, as shown best in FIGURES 3 and 4. All of the feet are tied securely to the hull structure by hold-down bolts which extend through a deck beam B and the deck beneath the respective feet and are threaded upwardly into threaded holes extending axially of the feet and radially of their ball ends, as shown in FIGURES 3 and 4, extending upward centrally through the annular deck pad.

If the slope of the deck beneath the four bearing points of the inner anchoring feet of the winch shown in FIGURE 1 is such that those four points are not coplanar when the winch is oriented as desired, at least three of such bearing points will be. At the fourth bearing point and beneath the four outer feet, adjustable foot-anchoring units will be employed in which the foot is divided into a lower end portion **52***a*, having a lower hemispherical end, and an upper cylindrical portion **52***b* carrying the saddle **54** integral with its upper end. Such a divided anchoring foot unit is shown in FIGURES 2, 3, 4 and 5. Between the upper and lower portions, **52***a* and **52***b* of such foot, are inserted half washer fillers **52***c*, which may be individually of different thicknesses to provide in combination a filler section between the upper portion **52***b* and the lower portion **52***a* of the foot to make such foot of proper height so as to maintain the two struts **51'** at opposite sides of the winch in parallel coplanar relationship and straight, the axes of all of the reels in alignment and the load of the winch substantially equalized among the several winch-anchoring feet units.

It will be evident that whether a winch-anchoring foot unit of the type **52**, or of the type **52***a*, **52***b*, **52***c*, is used the foot of the unit can seat in the socket of the deck pad **8** with these two parts interengaged around a small circle of the ball end of the foot with line contact, whatever may be the tilt angle between the top or bottom of the deck pad and the axis of the foot along the bolt-receiving hole through it. Thus, the engagement of the foot's ball end and the socket of the deck pad forms a universal joint so that the deck pad can seat evenly on the deck irrespective of the direction or degree of slope of the deck relative to the axis of the strut **51'**, to which the anchoring foot unit is attached. Also, the central aperture through the deck pad is sufficiently large to afford ample clearance for passage of the hold-down bolt **81**, irrespective of such angle of tilt. Thus, the winch frame-engaging portion of the anchoring foot unit and the deck-engaging portion of the anchoring foot unit can be made adjustable in character, both angularly and in length, to enable the foot unit to support the particular portion of the winch frame without special fitting of the unit to the frame, or the deck, and without such unit being subjected to concentrated or offcenter stresses.

In installing a winch by the use of the winch mounting described it is important that the several deck pads and hold-down bolt-receiving anchor holes be prelocated so that the feet carrier by the winch can simply be set into the sockets of the deck pads when the winch is lowered for placement, instead of it being necessary to hold the winch in slightly suspended position, or to block it up, while some or all of the foot units are located, or their locations adjusted to final position. The correct location of the bolt-anchoring holes and the proper direction of such holes is established by use of a drill jig.

The inner four deck pads **8** will be secured in their proper positions relative to the bolt-anchoring holes in the deck and deck beams and the sealing collars **56** will be placed in the sockets of the deck pads. In addition, the lower end parts **52***a* of the outer feet may be placed in the sockets of their respective deck pads before the winch is lowered into place. Such foot end parts **52***a* can be secured loosely in place before the winch is installed by inserting the corresponding hold-down bolts **81** from beneath the deck beam B and screwing such bolts up into the tapped apertures in the foot parts, but preferably the bolt ends should not project appreciably beyond the upper flat side of the foot ends. The winch is then hoisted, swung into position and lowered to insert the feet **52** into their corresponding deck pad sockets, in the manner previously described. The hold-down bolts **81** may be screwed into the feet **52** to secure the winch in place, after which the confining ring sections can be removed, either before or after installation of the winch is completed.

In installing a winch of the type shown in FIGURES 1 and 2 it is not necessary to secure the outer deck pads **8** in position initially because such deck pads actually could be slid into their proper positions even after the winch has been secured in place by hold-down bolts screwed into the feet **52**. Alternatively, such outer deck pads would be anchored in place by their bolts **81** being partially inserted into the lower parts **52***a* of the outer feet, which have been received in the sockets of their deck pads. Whichever technique is followed the next step is to raise each end portion of each strut **51'**, perhaps through an increment such as indicated by space *a* in FIGURE 3, until each strut is precisely straight throughout its entire length. Such strut end-lifting operation can be accomplished by relative rotation of the outer hold-down bolts **81** and the foot parts **52***a* threaded on them and bearing on the sealing collars **56**, received in the deck pad sockets.

For the purpose of this lifting operation holes **57** are provided in each upper foot part **52***b* extending diametrally perpendicular to the axial bores through these foot parts, and bearing pins **58** are passed through these cross apertures, as indicated in FIGURES 2 and 3. The axial bore in the foot portion **52***b* is not tapped, but is of a size to enable the threaded portion of the hold-down bolt **81** to pass freely through such axial bore. The lugs of a lug wrench W are fitted into sockets **59** in the upper surface of the lower foot part **52***a* to hold such part from turning relative to its deck pad **8**, while the hold-down bolt **81** is turned to screw it through the foot part **52***a* so that its upper end will enter the axial bore in the upper foot part **52***b* secured to the strut **51'**. When the bolt end has thus entered the bore of the foot part **52***b* for a predetermined distance, the bolt end will engage the bearing pin **58** and thereafter additional turning of the bolt will produce an upward thrust on the bearing pin to lift the end portion of the strut **51'** through the angular increment *a* indicated in FIGURE 3, to straighten the strut. Preferably, the bolts at all of the corners of the winch are thus adjusted and the alignment of the struts **51'** checked so that the center lines of these struts will also be precisely parallel before the next step in the installation of the winch.

When the struts **51'** have thus been straightened the wrenches W are removed from engagement with the lower foot portions **52***a*, and the half washer fillers **52***c* are inserted at opposite sides of the hold-down bolt at each corner of the winch to fill the gap between the adjacent surfaces of the foot parts **52***a* and **52***b*. Such washer parts should be selected in number and thickness to fill the gap exactly in each instance. The filler washers and

foot parts are then welded together, as shown at the left of FIGURE 4, so that the upper and lower foot parts and the filler washers become a single integrated foot. Following completion of this welding operation in each instance the hold-down bolt **81** in that corner can be retracted slightly to free the bearing pin **58**, which will then be removed from the holes **57** in the foot. The hold-down bolt may then be screwed upward again and such turning can be continued until the bolt head has been tightened against the washer, as shown in FIGURE 4. Anchoring of the winch of the type shown in FIGURES 1 and 2 is thus completed.

I claim:

The method of mounting on a nonplanar deck a winch having at least four feet, which comprises settling the winch on the deck, varying the spacing between upper and lower parts of at least one winch foot to assure firm bearing of all the winch feet on the deck, inserting filler means between such spaced upper and lower winch foot parts, and bonding such filler means to at least one foot part and thereby retaining such upper and lower foot parts permanently in their adjusted spaced relationship engaged with such filler means.

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