

Feb. 15, 1966

F. J. LUKETA

3,235,206

TRAWL WINCH MOUNTING

Filed Dec. 31, 1962

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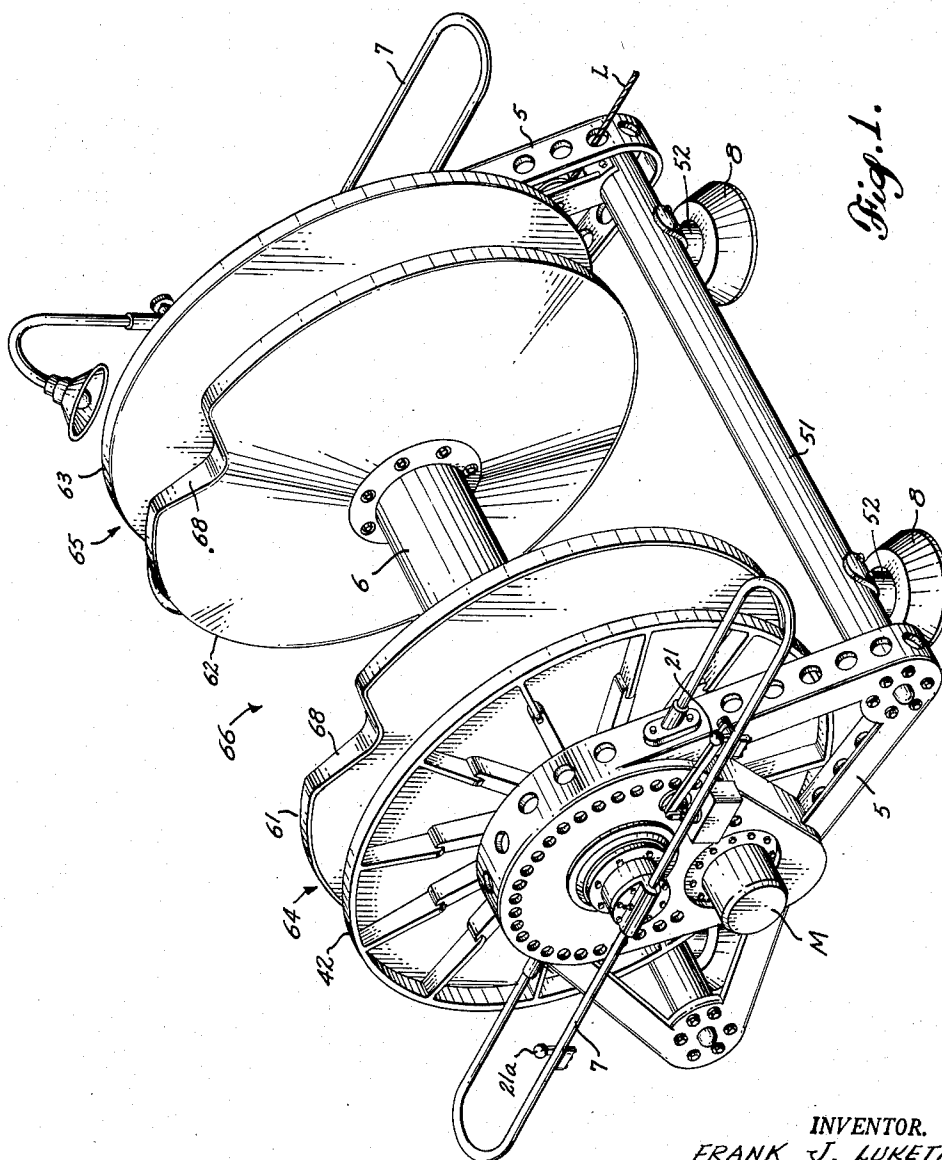


Fig. 1.

INVENTOR.
FRANK J. LUKETA

BY

Robert W. Beach

ATTORNEY

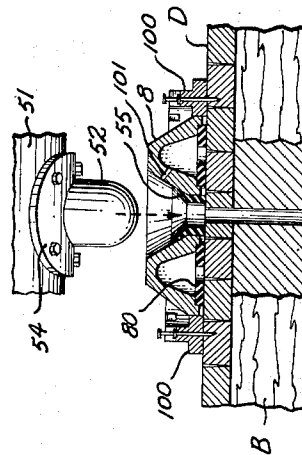
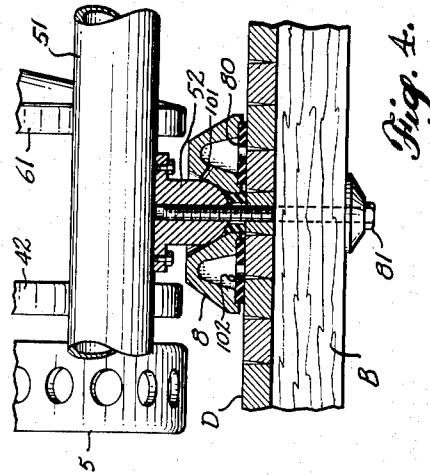
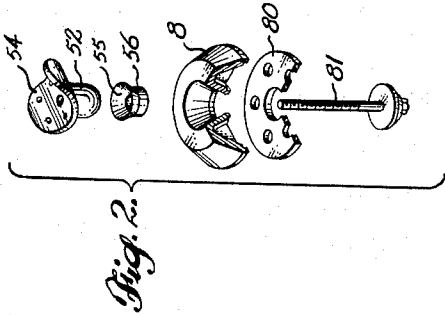
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INVENTOR
FRANK J. LUKETA

BY

Robert W. Beach

ATTORNEY

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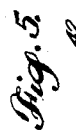
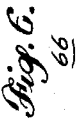
F. J. LUKETA

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INVENTOR.
FRANK J. LUKETA

BY

Robert W. Beach

ATTORNEY

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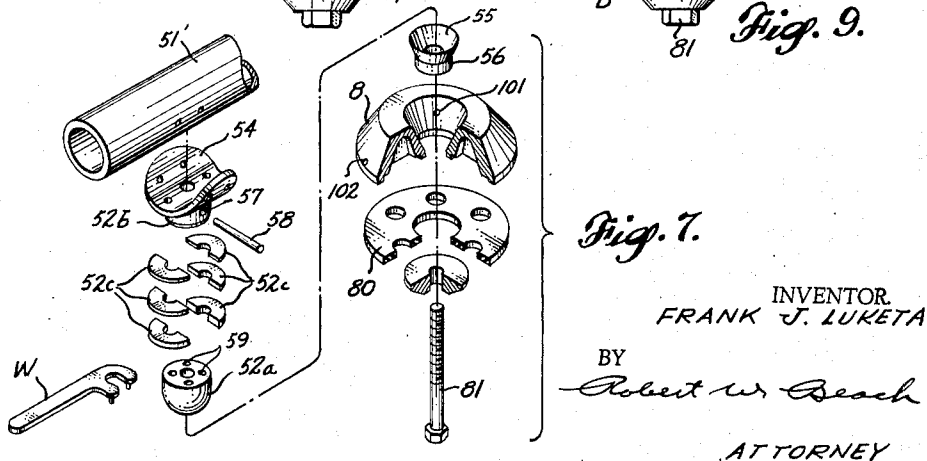
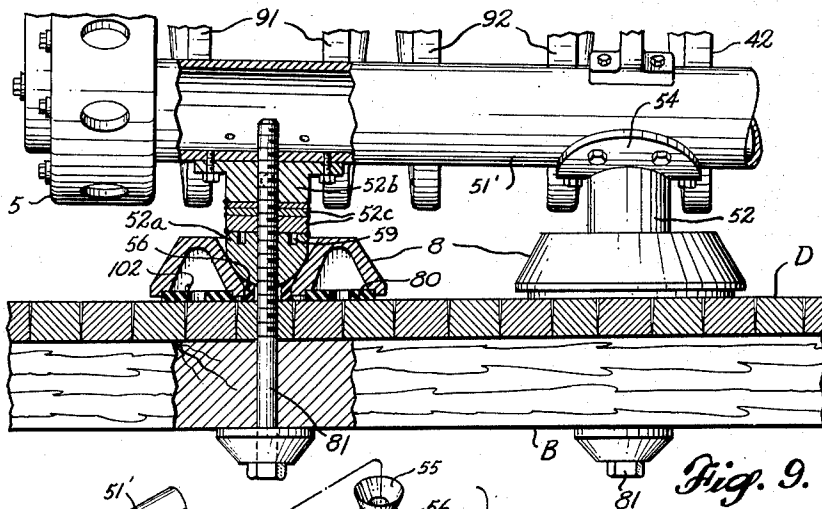
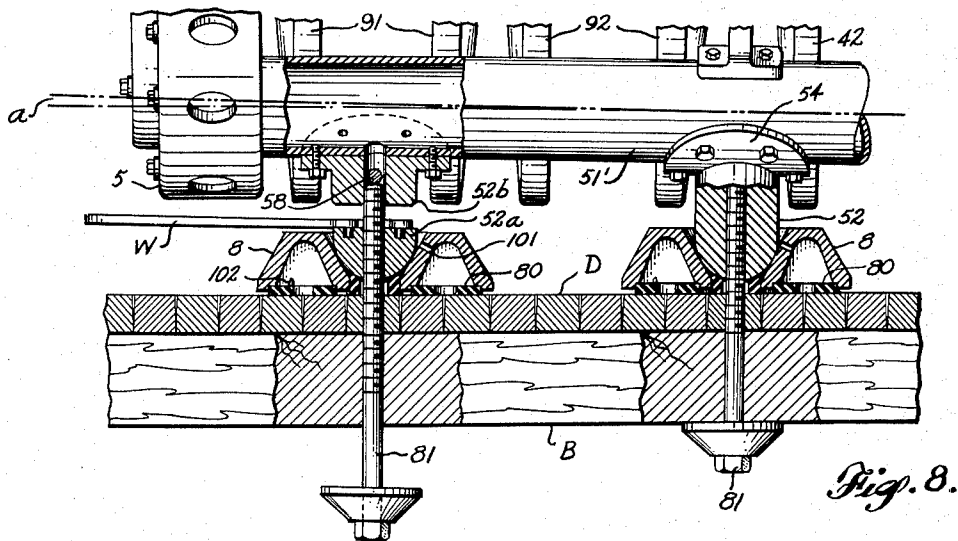
F. J. LUKETA

3,235,206

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INVENTOR.
FRANK J. LUKETA

BY

Robert W. Beach

ATTORNEY

1

3,235,206

TRAWL WINCH MOUNTING

Frank J. Luketa, 5567 Greenwood Ave. N.,
Seattle 3, Wash.

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6 Claims. (Cl. 248—23)

This application 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 independent handling of trawl lines, or other lines. The winch mounting 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 a 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.

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 slopes, and to enable such uniform stress distribution to be maintained without periodic adjustment of the parts being required.

The principle of the present winch mounting can be applied 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 produce 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 an aft top perspective of a representative winch utilizing the winch mounting of the present invention.

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FIGURE 2 is a top perspective of a winch anchoring foot unit, the parts of which are in exploded relationship, and portions being broken away.

FIGURE 3 is a vertical section through the deck pad portion of a winch foot anchoring unit and temporary holding ring with the foot element of such unit in elevation and disposed in exploded position, and FIGURE 4 is a similar view of the winch anchoring foot unit with the foot element and deck pad element in assembled relationship and the foot element, as well as the deck pad element, being in vertical section.

FIGURE 5 is a top perspective of a representative type of winch, different from that shown in FIGURE 1, utilizing the winch mounting of the present invention and

FIGURE 6 is a side elevation of a portion of such winch showing its mounting on an enlarged scale with two of the winch anchoring foot units being shown in vertical section.

FIGURE 7 is a top perspective of a winch foot anchoring unit different from that of FIGURE 2, with parts shown in exploded relationship, and portions being broken away.

FIGURE 8 is a vertical section through winch anchoring foot units on a scale larger than FIGURE 6, and illustrating two different types of winch anchoring foot units, and FIGURE 9 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 8.

Winches of the types shown in FIGURES 1 and 5 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 winches shown in FIGURES 1 and 5 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 end flanges 42 and 63, which are also secured to the winch drum at its opposite ends. The end flange 42 and the adjacent intermediate flange 61 define the side reel 64 between them, the end 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 nobs 21 and 21a, 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.

The deck D is normally slightly crowned to enable water to drain to the scuppers. Mounting of a winch of the general type described upon such a crowned deck is normally an expensive and laborious job. The mounting shown in the drawings reduces the labor and cost to a minimum and enables the winch to be mounted securely in a fraction of the usual time. The mounting structure is of even greater benefit for mounting a larger and more complicated winch of the type shown in FIGURE 5. In that winch in addition to the end flanges 42 and 63 and the intermediate flanges 61 and 62 form-

ing 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 5 and 6, 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 trawl 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 independent 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 of the winch shown in FIGURE 1 and 51' of the winch shown in FIGURES 5 and 6 are supported by anchoring foot units. Where the length of the winch is sufficiently great, as is that of the winch shown in FIGURES 5 and 6, the 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 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 4, 6, 8 and 9, 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. In designing the trawler or other boat, therefore, the marine architect should have in mind the type of winch which it is desired to install on the trawler deck and the preferred location which it should occupy, and the direction in which the line of pull of the winch should extend so that the precise position of the winch support points on the trawler deck will be known in advance of establishing the location of the deck beams B in the trawler design. These beams should then be located to coincide with the position on the deck in which the winch is to be installed. It may be that in some instances it will not be possible to locate the main deck beams properly for this purpose, in which case intermediate beams, or bridging beams, should be provided so that in every instance a winch anchoring foot unit will overlie a deck beam.

Also, it is preferred that despite any slope which the deck may have the four bearing points on the deck coinciding with the four feet of the winch, shown in FIGURE 1, and the four inner anchoring foot units of the winch shown in FIGURES 5 and 6 will be in coplanar relationship, 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 non-adjustable character. 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 complementary to the curvature of the strut 51, or 51', and receiving such strut. Such saddle of each foot is secured to a strut 51, or 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 will be received in sockets, preferably of frustoconical shape, in deck pads 8, which rest on gaskets 80 on the deck D, as shown best in FIGURES 4 and 8. 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 4 and 8, extending upward centrally through the annular deck pad.

If the slope of the deck beneath the four bearing points of the winch anchoring feet units shown in FIGURE 1, or beneath the four bearing points of the inner anchoring feet units of the winch shown in FIGURES 5 and 6, 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 at the outer bearing points of the winch shown in FIGURES 5 and 6, adjustable winch anchoring foot units will be employed in which the foot is divided into a lower end portion 52a, having a lower hemispherical end, and an upper cylindrical portion 52b carrying the saddle 54 integral with its upper end. Such a divided anchoring foot unit is shown in FIGURES 7, 8 and 9. Between the upper and lower portions, 52a and 52b of such foot, are inserted half washer fillers 52c, which may be individually of different thicknesses to provide in combination a filler section between the upper portion 52b and the lower portion 52a of the foot to make such foot of proper height so as to maintain the two struts 51, or 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 52a, 52b, 52c, 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, or 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 carried 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 loca-

tion of the bolt-anchoring holes and the proper direction of such holes is established by use of a drill jig.

When each deck pad has been secured in position the sealing collar 56 of the anchoring foot unit shown in FIGURE 2 is placed in the socket of the deck pad, as shown in FIGURE 3. This sealing collar has a lower cylindrical tubular portion which fits into the central aperture of the deck pad and an upper portion 55 flaring upwardly and tapering from the cylindrical portion at an external angle complementary to the conical shape of the deck pad socket. The upper portion of this sealing collar extends upwardly sufficiently far so that it will be engaged by the hemispherical portion of the winch foot 52, or 52a, when it is placed in the socket. Also, such sealing collar is made of soft yieldable material, which preferably is resilient, such as being of elastomeric material, so that it will be deformed by engagement of the winch foot with it and will effect a water-tight seal between the ball end of the winch foot and the deck pad socket.

When all of the deck pads 8 for the particular winch have been located precisely and held in position and the sealing collars 56 have been placed in them, as shown in FIGURE 3, the winch is hoisted, swung into position and guided as it is lowered to effect movement of the feet 52 from raised positions, such as shown in FIGURE 3, into the lowered positions of FIGURE 4. Because of the preparatory procedure described it will be found that each winch foot fits accurately into the conical socket of its corresponding deck pad 8. Moreover, the axially extending aperture in each foot will be aligned precisely with the hold-down bolt anchor hole drilled in the deck D and deck beam B. It is therefore only necessary to insert the anchor bolt 81 from below upward through such hole and to screw it into the tapped bore of the winch foot, as shown in FIGURE 4. Preferably a large washer will be provided on each bolt against which the bolt head will bear and the washer will bear on the bottom of the deck beam. If the bolt anchor hole is not precisely perpendicular to the bottom of the deck beam there may be a slight tilt between the washer and the bolt, but this should not be great enough to affect adversely the anchoring action of the bolt. Any such tilt of the washer relative to the bolt may, however, be obviated by trimming, or countersinking, the lower side of the deck beam slightly to provide a seat for the washer which is precisely perpendicular to the axis of the bolt anchoring hole. When the hold-down bolts have thus been secured the nails can be pulled from the confining ring sections 10 encircling the deck pads 8, so that such ring sections can be removed.

If a winch of the type shown in FIGURES 5 and 6 is being installed 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 52a 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 52a 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 5 and 6 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 52a 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 8, 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 52a 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 52b extending diametrically perpendicular to the axial bores through these foot parts, and bearing pins 58 are passed through these cross apertures, as indicated in FIGURES 7 and 8. The axial bore in the foot portion 52b 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 52a 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 52a so that its upper end will enter the axial bore in the upper foot part 52b secured to the strut 51'. When the bolt end has thus entered the bore of the foot part 52b 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 8, 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 52a, and the half washer fillers 52c 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 52a and 52b. 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 9, 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 9. Anchoring of the winch of the type shown in FIGURES 5 and 6 is thus completed.

As has been mentioned, the sealing collar 56 between the lower ball end of each foot and the socket of its deck pad 8 effects a seal between these parts which prevents water from seeping past the ball end of the foot and through the central aperture in the deck pad downward alongside the shank of the hold-down bolt to leak through the deck. Water from rain and spray will, however, enter the crevices between each winch foot and the socket of the deck pad in which it is received. It is desirable to enable such water to escape and for that purpose a drain hole 101 may extend through the inner wall of the deck pad from its socket to its hollow interior, as shown in FIGURE 8, and a second drain hole 102 is provided in the outer wall of the deck pad between its hollow interior and its outer surface. If the hollow in-

terior of the deck pad is divided into several circumferential groove portions by radial webs, it will be necessary to provide an inner drain hole 101 and an outer drain hole 102 in the same groove section, and such inner and outer drain holes can be provided in more than one groove section of each deck pad, if desired.

I claim:

1. A winch mounting for mounting a winch on a deck, comprising a plurality of feet adapted to be mounted on the winch spaced laterally and longitudinally of the winch and having lower ball ends, deck pads adapted to rest on the deck at locations corresponding, respectively, to the locations of said feet, and having upwardly opening sockets for receiving said feet, and securing means connected to each of said feet, adapted to extend through the deck pad engaged therewith and the deck therebeneath and to be anchored beneath the deck and including adjustable means for adjusting the length of one of the feet to compensate for the departure of the deck from a plane.

2. The winch mounting defined in claim 1, wherein one of the feet includes an upper part and a lower ball end part which are spaced apart and the adjustable means includes filler means for insertion between said parts to establish the adjusted length of such foot.

3. In combination, a winch mounting, a winch and a deck, said mounting comprising a plurality of feet on said winch spaced laterally and longitudinally of said winch and having lower ball ends, deck pads resting on said deck at locations corresponding, respectively, to the locations of said feet, and having upwardly opening conical sockets receiving said feet, and a hold-down bolt connected to each of said feet, extending centrally through said deck pad engaged therewith and said deck therebeneath and anchored beneath said deck.

4. A winch mounting comprising a deck pad having a socket therein, and a foot adapted to be carried by the winch having its lower end engageable in said socket, and said foot including an upright bolt, an upper part and a

lower part through which said bolt passes, said bolt being threaded in said lower part, and filler means disposed between said upper part and said lower part and holding said parts in spaced relationship.

5. In combination, a winch mounting and a winch for mounting on a deck, said mounting comprising a deck pad having an aperture therethrough such that the upper portion of such aperture constitutes a foot-engaging socket cup having an upwardly flaring wall, a foot carried by said winch and engaged in said socket cup, and a sealing ring engaged between said foot and said upwardly flaring wall of said socket cup sealing such deck pad aperture against flow of liquid therethrough.

6. A winch mounting comprising a bolt, an upper foot part adapted to be carried by a winch and having a downwardly facing opening therein adapted to be engaged by the upper end of said bolt, and a lower foot part having a threaded upright aperture extending therethrough threadedly engaged with said bolt for adjustment of the spacing between said upper and lower foot parts by relative rotation of said bolt and said lower foot part.

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CLAUDE A. LE ROY, *Primary Examiner.*