Nov. 22, 1966 J. R. SPERG 3,286,851

CARGO HANDLING RIG

Filed Nov. 6, 1964 3 Sheets-Sheet 1

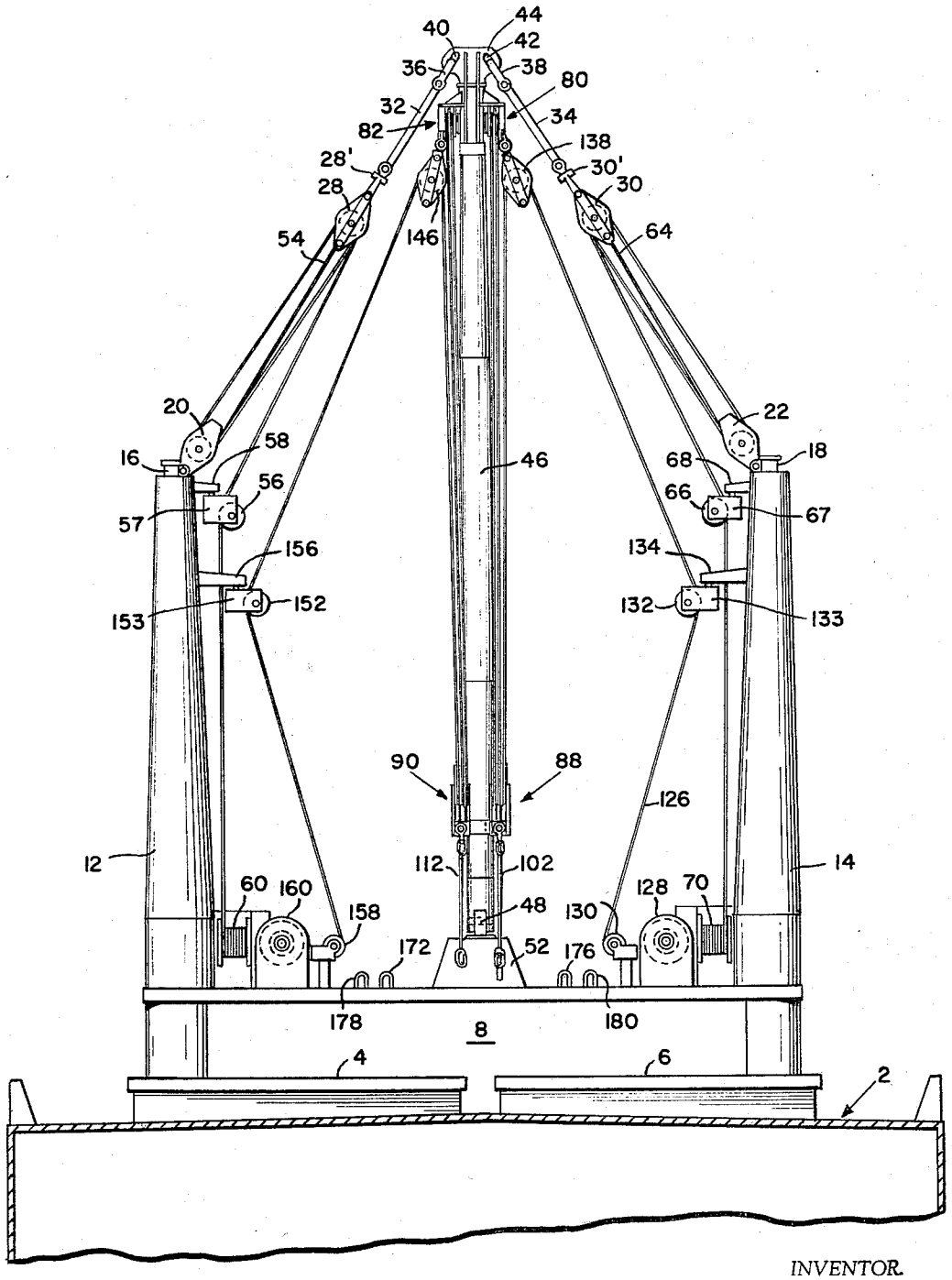


FIG. 1.

INVENTOR.
JOHN R. SPERG
BY Russel Smith & Harding

ATTORNEYS

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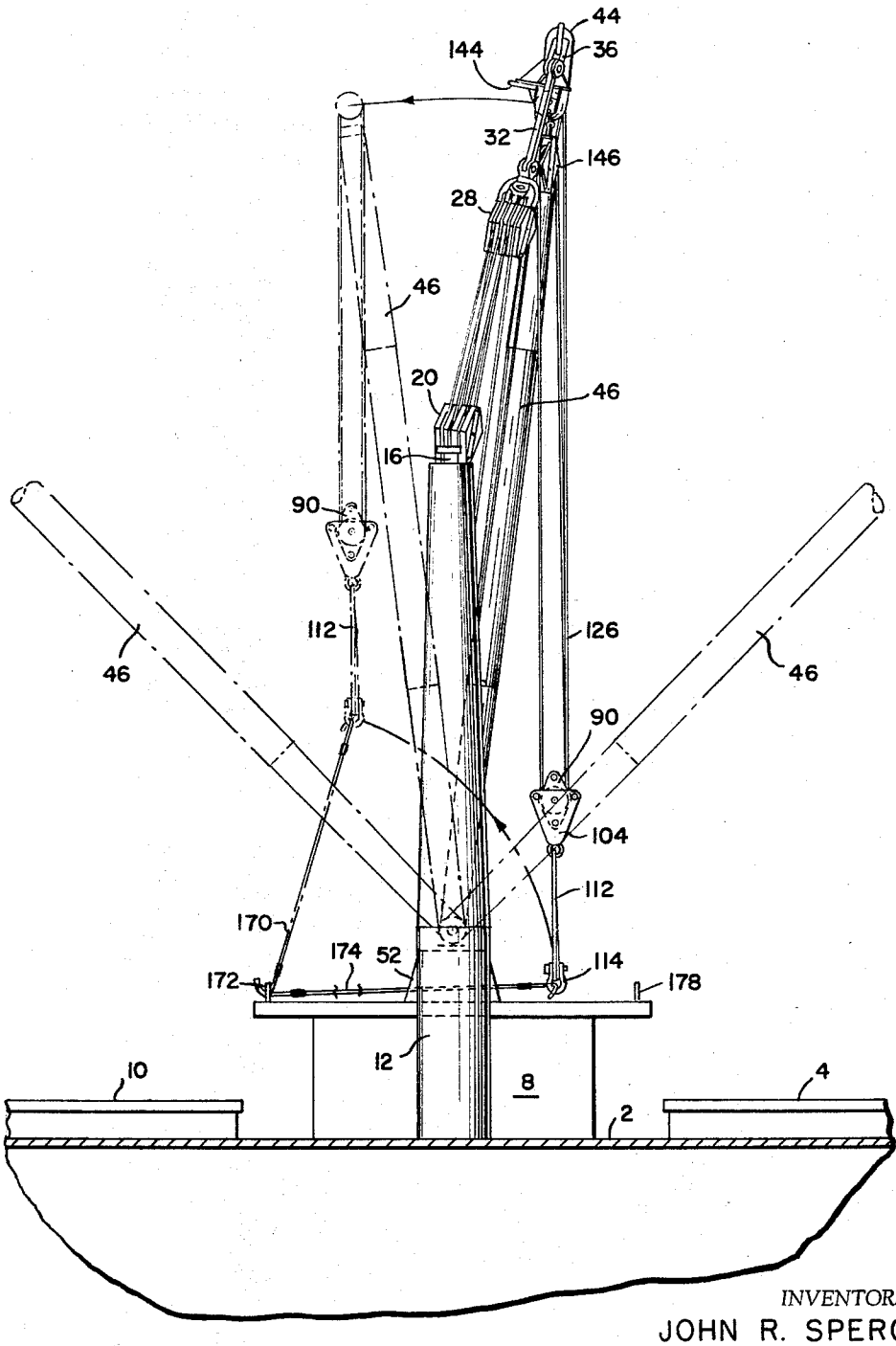


FIG. 2.

INVENTOR.
JOHN R. SPERG
BY Brisse Smith & Hardy

ATTORNEYS

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CARGO HANDLING RIG

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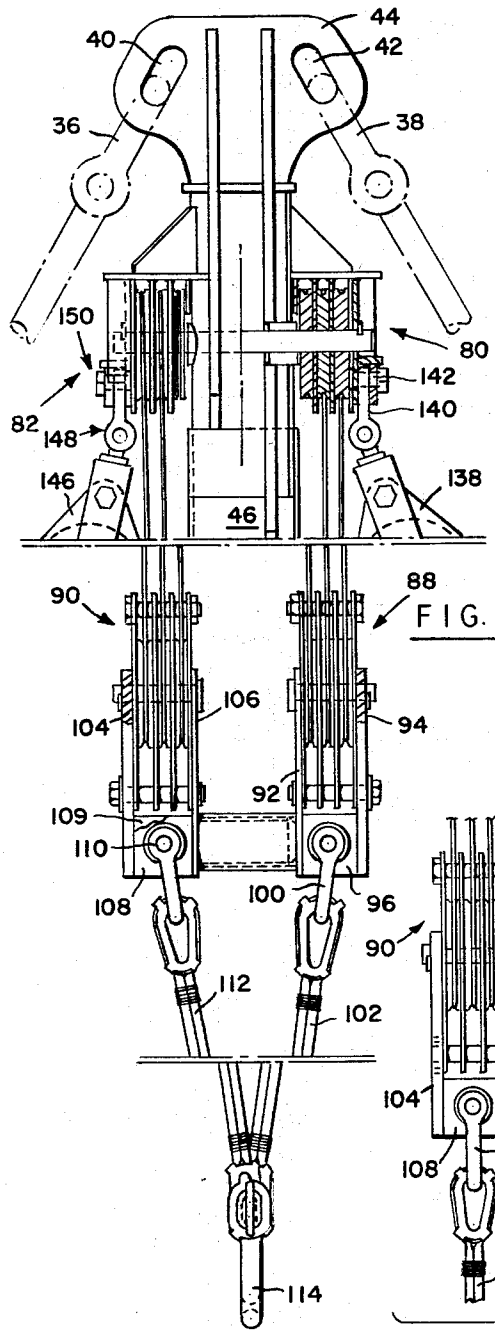


FIG. 3.

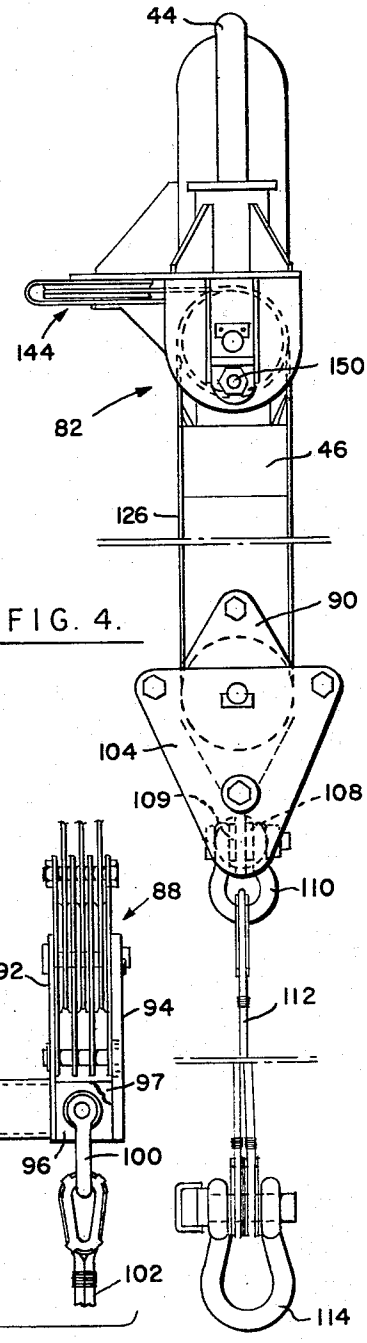


FIG. 4.

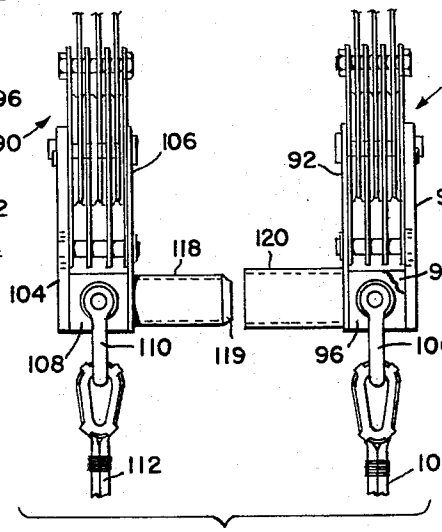


FIG. 5.

INVENTOR.
JOHN R. SPERG
BY Brisen Smith & Hard

ATTORNEYS

United States Patent Office 3,286,851 Patented Nov. 22, 1966

3,286,851

CARGO HANDLING RIG

John R. Sperg, Philadelphia, Pa., assignor to Sun Shipbuilding & Dry Dock Company, Chester, Pa., a corporation of Pennsylvania

Filed Nov. 6, 1964, Ser. No. 409,356
3 Claims. (Cl. 212—3)

This invention relates to a cargo handling rig which is particularly suitable for shipboard use.

It is frequently desired to employ a single boom which is capable of working a hatch forward of the boom and a hatch aft of the boom. This is particularly the case when it is desired to provide a ship with but a single heavy lift boom having, for example, a capacity of 80 tons and yet it is desired to have a heavy lift boom available for more than one cargo hold. United States Patents No. 3,107,790, 2,914,193, 3,042,222, and 3,110,-403 are illustrative of the development of cargo handling rigs to serve two holds. As will be readily apparent, the central problem in such rigs is in the structure of the cargo falls to provide for its use both when the boom is working the hold forward of it and when the boom is working the hold aft of it. The heretofore known rigs are either expensive and/or difficult to operate. The rig of this invention is at once inexpensive and very simple to operate.

The invention and its objects will be fully clarified on reading the following description in conjunction with the drawings, in which:

FIGURE 1 is a transverse elevation partially broken away of an embodiment of the cargo handling rig in accordance with the invention with the boom extending slightly aft;

FIGURE 2 is a longitudinal elevation partially broken away of the cargo handling rig of FIGURE 1;

FIGURE 3 is an enlarged transverse elevation partially broken away showing elements of the cargo falls of the rig of FIGURE 1;

FIGURE 4 is a longitudinal elevation partially broken away of the cargo falls elements of FIGURE 3; and

FIGURE 5 is a transverse elevation partially broken away showing the cargo falls blocks of the rig of FIGURE 1 with the blocks separated.

A cargo ship main deck **2** has cargo hatches **4** and **6** longitudinally adjacent to a winch house **8** and a cargo hatch **10** at opposite ends of winch house **8**. Kingposts **12** and **14** which are one suitable form of masts are located on the port and starboard side of winch house **8** and have supported on the top thereof swivel members **16** and **18** which pivot on a vertical axis and to which topping lift kingpost blocks **20** and **22** are respectively pivotally secured for pivoting on a horizontal axis. Upper topping lift blocks **28** and **30** by means of swivel eyes **28'** and **30'**, respectively, to allow axial rotation are respectively connected to pendants **32** and **34** which in turn are pivotally connected to shackles **36** and **38** which respectively engage openings **40** and **42** in boom head member **44** of boom **46** in which the shackles are free to swing from side to side as well as up and down.

Boom **46** which may, for example, be a heavy lift boom is mounted at its heel between kingposts **12** and **14** for universal movement in the conventional manner being mounted for pivotal movement about a horizontal axis on support **48** which is mounted for free rotation on a vertical axis on a boom pedestal **52** mounted on top of winch house **8**.

Wire cable **54** is secured to block **28** and reeved through blocks **20** and **28** and passes about sheave **56** which is carried by member **57** pivotally secured on a vertical axis to support member **58** fixedly secured to kingpost **12** and thence downwardly to topping lift winch

60. Wire cable **64** is secured to block **30** and is reeved through blocks **22** and **30**, and passes about sheave **66** secured to support member **67** which is pivotally secured in a vertical axis to support member **68** which is fixedly secured to kingpost **14**. Cable **64** passes downwardly from sheave **66** to topping lift winch **70**.

The above described structure is essentially conventional for a number of heretofore known heavy lift cargo rigs which are employed with a forward and an after cargo hold. It is, for example, substantially the same as described in W. T. Sparrow Patent No. 3,110,403.

The novel cargo falls will now be described. A multiple sheave **80** and a multiple sheave **82** are respectively secured to opposite sides of boom **46** and are respectively associated with cargo falls blocks **88** and **90**. As best seen in FIGURE 3, block **88** has secured thereto a pair of plates **92** and **94**. A pair of plates **96** and **97** (FIGURE 4) are welded to plates **92** and **94** and are provided with openings (not shown) which are engaged by shackle **100** holding a pendant **102**. Similarly, block **90** has secured thereto a pair of plates **104** and **106** which in turn have welded thereto a pair of plates **108** and **109** having openings (not shown) for the reception of a shackle **110** which supports a pendant **112**. The lower looped end of pendants **102** and **112** are shackled together by a shackle **114** which may be employed to engage a sling, cargo net or the like containing the cargo to be lifted.

A tubular male member **118** having a beveled end **119** is welded to plate **106** and is adapted to enter tubular female member **120** which is welded to plate **92**. The insertion of member **118** into member **120** maintains the same spread between blocks **88** and **90** as between multiple sheaves **80** and **82** at boom head and prevents unequal loading in the cargo falls.

Referring now to FIGURE 1, a wire cable **126** is wound on winch **128** and passes around a sheave **130** and upwardly about sheave **132** which is secured to a support member **133** which in turn is pivotally secured on a vertical axis to support member **134** which is fixedly secured to kingpost **14**. Cable **126** then passes upwardly through fair lead block **138** which is secured to multiple sheave assembly **80** by swivel eye bar **140** and pin **142** (FIGURE 3). Cable **126** is then reeved through block **88** and sheave **80**. It is led from multiple sheave assembly **80** around horizontal equalizing sheave **144** (FIGURE 4) mounted on the boom head and thence is reeved through multiple sheave assembly **82** and block **90**. Cable **126** passes from block **90** through fair lead block **146** which is secured to multiple sheave assembly **82** by swivel eye bar **148** and pin **150** and thence about sheave **152** which is secured to support member **153** which is pivotally secured on a vertical axis to support member **156** which is fixedly secured to kingpost **12**. Cable **126** then passes over sheave **158** and is wound onto winch **160**.

In normal operation, blocks **88** and **90** are held together by the horizontal components of hook load and the spread between blocks is maintained by members **118** and **120**, the boom **46** being topped to the desired location by the operation of topping lift winches **60** and **70** and the associated topping lift gear. Thus assuming the boom to be in the position shown in FIGURES 1 and 2, if it is desired to work hatch **4**, cables **54** and **64** are paid out from winches **60** and **70** until boom **46** is in the desired position with shackles **114** over, for example, the sling to be engaged and hoisted. Blocks **88** and **90** and shackle **114** are then lowered by paying out cable **126** from winches **128** and **160** until shackle **114** can be attached to the load. Blocks **88** and **90** are then hoisted by taking in cable **126** by both winches **128** and **160** to lift the load. Equalizing sheave **144**

permits the use of only one winch but the use of both winches better equalizes the load in the tackle. After the load is hoisted, winches **60** and **70** are employed in the conventional manner to spot boom **46** so that the load can be lowered over either the port or starboard side, for example, to a dock.

When it is desired to shift boom **46** from the operation of, for example, hatch **4** to operate over, for example, hatch **10**, winches **60** and **70** are operated to reel in cables **54** and **64** to elevate the boom to a position relatively close to the vertical on the center line of the ship. Boom **46** is shown in this position in FIGURES 1 and 2. Shackle **114** is then removed from pendants **102** and **112** and the blocks **90** and **88** are separated to the positions shown in FIGURE 5. A line **170** is then secured to the lower end of pendant **112** and to a pad eye **172** secured to the opposite end of the winch house and a line **174** is secured to pendant **102** and to a pad eye **176** secured to the opposite end of the winch house. Winches **128** and **160** are now operated to reel in cable **126** which elevates blocks **88** and **90** and tightens up on lines **170** and **174** spreading apart blocks **88** and **90** to clear boom **46** and then pulling boom **36** from the position slightly aft of the vertical as shown in FIGURE 2 to a position slightly forward of the vertical as shown in phantom in FIGURE 2. Lines **170** and **174** are then removed and shackle **114** or other suitable tackle is secured to pendants **102** and **112**. The boom **46** may then be spotted where desired by the operation of topping lift winches **60** and **70**. To shift the boom from a forward hatch to an after hatch, for example, from hatch **10** to hatch **4**, the reverse operation is carried out with the exception that pad eyes **178** and **180** which are secured to the other end of the winch house are employed.

It will be understood that the foregoing description is by way of illustration and not intended to be limiting.

What is claimed is:

1. Cargo handling apparatus comprising a boom having its heel mounted for universal movement, mast means mounted on either side of said boom heel, boom topping lift means connected to the boom head and said mast means for positioning the boom and a pair of cargo fall purchases having one of the purchases depending from one side of the boom head and the other of the purchases depending from the other side of the boom head, each purchase comprising a lower block and an upper block which is mounted adjacent the boom head, line means reeved through said purchases, winch means operatively connected to said line means, and means to connect together the lower purchase blocks comprising a projecting member on one lower purchase block and a hollow member for the reception of the projecting member on the other lower purchase block.

2. Cargo handling apparatus comprising a boom having its heel mounted for universal movement, mast means mounted on either side of said boom heel, boom topping lift means connected to the boom head and said mast means for positioning the boom over hatches forward and aft of the mast means, a pair of cargo fall purchases comprising a pair of sheave means mounted on opposite sides of the boom head and down the boom from the points of connection of the topping lift means to the boom and a pair of lower purchase blocks, means to removably connect together the lower purchase blocks, equalizing sheave means at the boom head, a pair of lead blocks mounted on opposite sides of the boom head and down the boom from the points of connection of the topping lift means to the boom, a pair of winches, and a line having its free ends respectively wound on the winches and sequentially extending from one winch, below one topping lift, and through one lead block, reeved through one of the purchases, the equalizing sheave means, and the other purchase, and extending through the other lead block, below the other topping lift and thence to the other winch.

3. Cargo handling apparatus in accordance with claim **2** in which the means to connect together the lower purchase blocks comprises a projecting member on one of the lower purchase blocks and a hollow member for the reception of the projecting member on the other of the lower purchase blocks.

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ANDRES H. NIELSEN, *Primary Examiner.*

SAMUEL F. COLEMAN, EVON C. BLUNK, *Examiners.*

A. L. LEVINE, *Assistant Examiner.*