Sept. 13, 1966 G. P. LAMER ETAL 3,272,362

BOAT HOIST APPARATUS

Filed Nov. 2, 1964 2 Sheets-Sheet 1

FIG. 1.

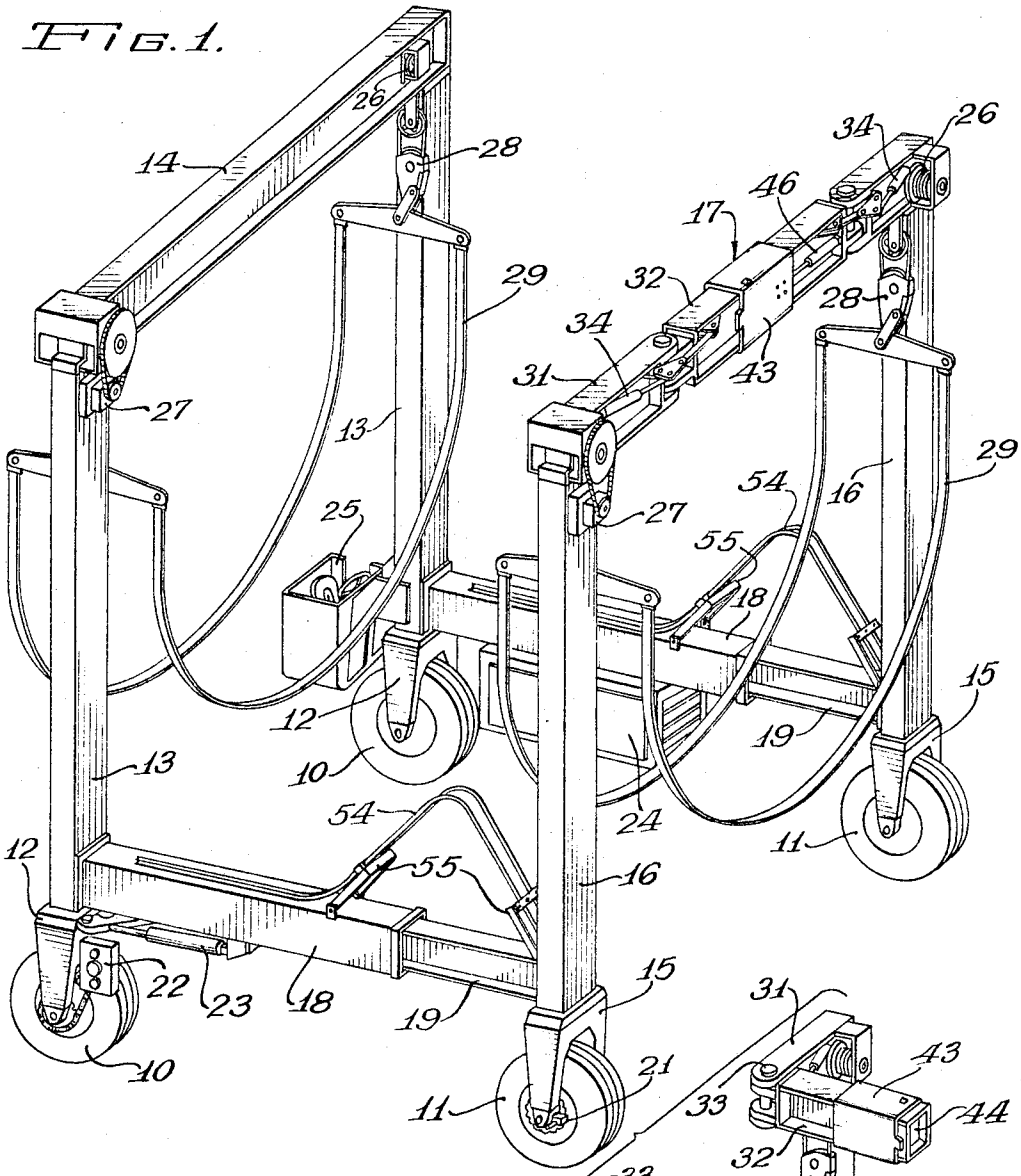
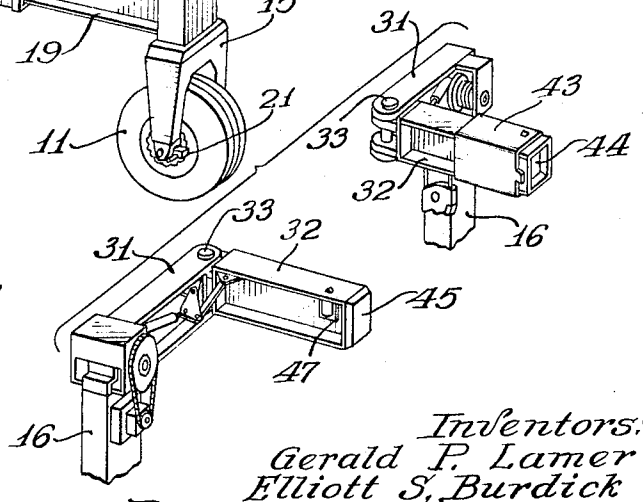


FIG. 2.



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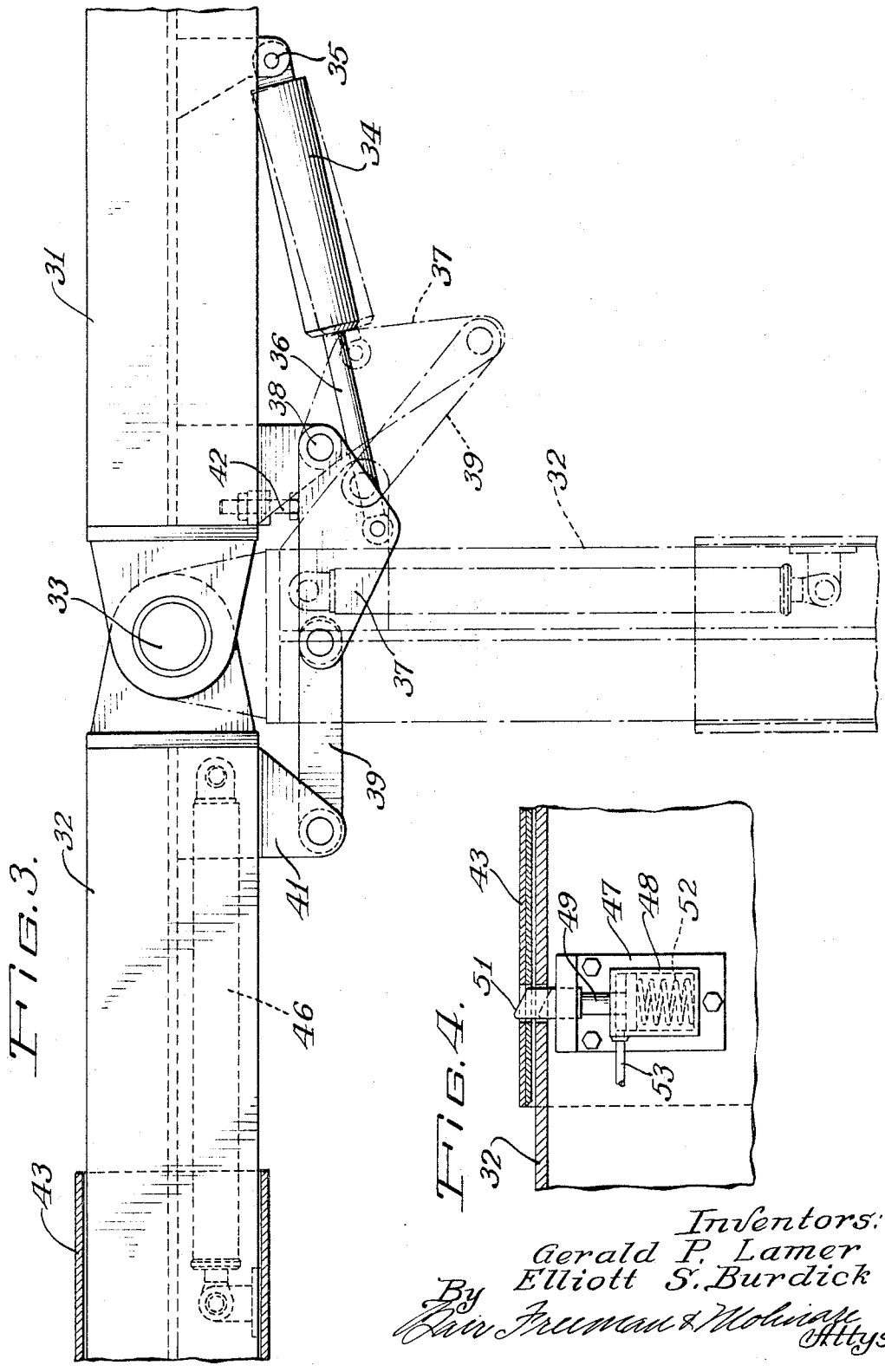


FIG. 3.

FIG. 4.

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BOAT HOIST APPARATUS

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5 Claims. (Cl. 214—396)

This invention relates to boat hoist apparatus and more particularly to an apparatus for lifting and transporting boats and similar devices having relatively tall masts or upwardly projecting structures.

Boats, as well as other types of loads, have commonly been handled by double gantry type vehicles with the loads being picked up through slings or the like by hoists carried by the gantries.

In handling sail boats, or similar devices having upwardly projecting masts or similar structures, it has been necessary that the upper beam member of one of the gantries be so constructed that it can be opened so that the mast can pass therethrough when the vehicle is being moved into or out of position over the boat. It is also necessary that the opening be securely closed during lifting and ttransporting of the boat or similar load to provide the requisite strength and rigidity in the gantry structure.

It has heretofore been proposed to provide the top beam for one of the gantries with supporting means through which it is slidable over one of the gantry columns with the beam being locked to the top of the other gantry column during the lifting and transporting operation. A construction of this type is more particularly described and claimed in the patent to Stearn, Re. 25,081.

It is a primary object of the present invention to provide an improved boat hoist apparatus of the double gantry type having a swinging gate structure in the top beam of one of the gantries which is operable easily from a remote point and which provides an extremely strong and rigid connection between the gantry columns when the gate is closed.

Another object is to provide a boat hoist apparatus in which the gate opening is provided by opposed gate members hinged for swinging movement in a horizontal plane from a closed aligned position to an open position spaced from each other.

According to a feature of the invention, the gate members may be swung between open and closed positions by hydraulic cylinders acting through control linkages which are constructed to swing the gate members through a relatively wide angle and to stop them accurately in aligned position.

A further object is to provide a boat hoist apparatus in which the gate members are rigidly connected by a sleeve slidable one one of the gate members and telescoping over the end of the other gate member when they are in aligned position to secure them rigidly together.

According to a feature of the invention the sleeve is moved by a hydraulic cylinder and is held in gate closing position by a mechanical latch which may be released by a hydraulic cylinder controllable from a remote point.

According to another feature of the invention, the gantries are secured to the ends of side rails formed of telescopically interfitting parts with one of the gantries supported on power driven wheels and the other on lockable wheels so that the spacing between the gantries can easily be adjusted.

The above and other objects and features of the invention will be more readily apparent from the following description when read in connection with the accompanying draws, in which:

FIG. 1 is a perspective view of a boat hoist apparatus embodying the invention;

FIG. 2 is a partial view showing the gate in open position;

FIG. 3 is a partial plan view with parts in section showing the operating linkage for the gate members; and

FIG. 4 is a partial section showing the latch for the gate locking sleeve.

The boat hoist of the present invention, as shown in FIG. 1, comprises a vehicle of the double gantry type supported on driven steerable wheels **10** at one end and on wheels rotatable on fixed axes, as shown at **11** at the other end. The wheels **10** are journaled on axles supported in a yoke or clevis **12** which is in turn mounted for rotation about a vertical axis in the lower ends of columns **13** which form the side columns of a rear fixed gantry strucure. This gantry structure is completed by a top beam **14** rigidly connected at its ends to the tops of the column **13** and spanning the space between them.

The wheels **11** are similarly journaled in yokes **15** which are rigidly secured to the lower ends of vertical columns **16** forming the side columns of a front gantry structure. This gantry structure is completed by a cross beam, indicated generally at **17**, and in which a gate opening is provided.

The corresponding side beams of the two gantry structures are connected by side rails formed by box beam sections **18** secured to the columns **13** and with I-beams **19** telescopically slidable therein so that the spacing between the gantries can be regulated. The beams **19** can be slid more or less into the beams **18** and locked in adjusted position thereby to adjust the spacing between the gantries. For adjustment, the front wheels **11** may be locked through ratchet devices indicated generally at **21** and which are more particularly disclosed and claimed in our co-pending application, case No. 64,247. The rear wheels **10** are power driven through hydraulic motors **22** and may be steered through steering cylinders **23** connected to the respective yokes for the wheels to turn them. Power for operating the motors and for operating the hoist mechanisms, to be described hereinafter, is supplied by pump and engine contained in an engine housing **24** secured to one of the side rails. The engine and supply of operating fluid to the driving motors and hoist motors, to be described hereinafter, may be controlled by an operator from an operator's compartment **25**, preferably mounted at one end of the vehicle, as shown.

The gantries carry hoist devices, including drums **26**, from which cables may be wound and unwound and which are driven by hydraulic motors **27** secured near the upper end of each of the columns **13** and **16**. The hoists are connected through cables to blocks **28** from which supporting devices, such as slings **29**, can be suspended. For lifting boats slings, as shown, are preferably employed which can be slipped under opposite end portions of the boats and connected to the hoists whereby the boat can be raised for transport. For other types of devices the slings might be replaced by grapples or similar mechanisms for engaging and lifting the device.

The gate structure **17** is adapted to be opened so that upwardly projecting parts, as the mast of a sailboat, can

pass through an opening in the top beam **17** when the vehicle is moved over a boat to pick it up or is moving away from the boat after having deposited it at a desired location. As shown, each of the columns **16** has a short angular extension **31** extending inwardly toward the opposite column with the extensions being relatively short so that an adequate space is left between their inner ends for the passage of a mast, or the like, therebetween. Gate members in the form of eye-beams **32** are hinged to the inner ends of the extensions **31** on vertical pivots **33** to swing from aligned gate closing positions, as shown in FIG. 1, to gate opening positions, as shown in FIG. 2, in which the gate members extend horizontally at substantially right angles to the extensions **31**. As best seen in FIG. 3, each of the gate members is moved by a hydraulic motor including a cylinder **34** pivoted at **35** to a bracket on the adjacent extension **31** and having a piston rod **36** extensible therefrom. The piston rod **36** is connected to the intermediate point of a triangular lever **37** pivoted at one end at **38** on a fixed bracket on the adjacent extension **31**. A link **39** pivotally connects the opposite end of the lever **37** to a bracket **41** on the adjacent gate member **32**.

When the hydraulic cylinder **34–36** is fully extended, as shown in FIG. 3, the linkage will be swung to an over center position to move the gate member **32** into alignment with the extension **31** and to hold it in that position. An adjustable stop **42** may be provided on the extension to engage the lever **37** when the gate member and extension are in alignment thereby to hold them in accurately aligned position. Since the lever **37** and link **39** constitute a locking toggle linkage, they will hold the gate members **32** aligned with extensions **31** without requiring maintenance of hydraulic pressure in cylinder **34–36**. To open the gate member the hydraulic cylinder is retracted or collapsed, as shown in dotted lines in FIG. 3. This will swing the lever **37** counterclockwise and through the link **39** will swing the gate member **32** counterclockwise. Due to the construction of the linkage, the gate member will move to substantially a right angle to the extension **31** so that the maximum gate opening is provided.

In order to rigidify the gate members when they are in their aligned closed position, a locking sleeve **43** is supported slidably on one of the gate members and is of a size to telescope over the end of the opposite gate member. Preferably also, as seen in FIG. 2, one of the gate members is formed in its extreme end with a shallow socket **44** and the opposite gate member is formed with a tapered tube **45** which will fit into the socket. This feature further assists in assuring alignment of the gate members and in retaining them in aligned positions.

When the gate members are aligned the sleeve **43** can be slid outwardly of the gate member on which it is mounted to telescope over the end of the opposite gate member by a hydraulic cylinder **46**. This cylinder **46**, as well as the cylinder **34** for swinging the gate members, can be remotely controlled by the operator from the operator's compartment. With this construction it will be seen that when the gate members are moved into alignment and the locking sleeve is slid to its locking position, the gate members will be securely and rigidly held in their aligned position and will provide an extremely rigid connection between the columns **16**.

Preferably the sleeve **43** is held in its locking position by a latch construction, as shown in FIG. 4. This latch construction comprises a plate **47** which may be securely mounted on the web of the one of the gate members **32** over the end of which the sleeve **43** slides. A cylinder **48** mounted on the web includes a piston whose piston rod **49** carries a latch projection **51** extending through an opening in the flange of the gate member **32** to engage in a latching opening in the sleeve **43**, as shown in FIG. 4. A spring **52** in the cylinder **48** normally urges the piston therein upwardly to project the latch into its latching position, as shown. To release the latch so that the sleeve can be slid back for opening the gate, fluid under pressure is supplied through a line **53** into the upper end of the cylinder **48** to force the piston downwardly therein so that the latch is retracted and disengages the opening in the sleeve **43**.

It will be seen that the several operations can be easily controlled ftom the operator's compartment with the fluid for operating the hoist motors and the cylinders on the forward gantry being supplied through flexible conduits **54**, as shown in FIG. 1, which extend along the side rails of the vehicle. When the side rails of the vehicle are fully extended these conduits will lie over the upper surfaces thereof, but when they are telescoped inwardly to bring the gantries close together, the conduits will buckle upwardly, as shown, and will thereby not interfere with entry or handling of a vehicle. To insure buckling of the conduits, hinged guide members **55** are connected to the side rails and the adjacent portions of the conduits.

It will be seen that by the present invention a gate opening can easily be provided in one of the gantry structures at any desired time so that an upwardly projecting part such as the mast of a sailboat can pass therethrough for loading or unloading. Upon completion of a loading or unloading operation the gate can be securely closed and will provide an extremely strong and rigid connection between the gantry columns so that the gantry structure has adequate strength for lifting and transporting loads.

While one embodiment of the invention has been shown and described in detail, it will be understood that this is for the purpose of illustration only and is not to be taken as a definition of the scope of the invention, reference being had for this purpose to the appended claims:

What is claimed is:

1. A boat hoist apparatus comprising a pair of spaced parallel frame side members, wheels supporting the side members for movement over the ground, a fixed gantry carried by the side members adjacent to one end thereof and including a pair of upright columns connected by a top beam, hoist devices carried by the gantry adjacent to the juncture of the columns and top beam, a pair of upright columns connected to the side members respectively adjacent to the other ends thereof, hoist devices carried by the last named columns at their upper ends, a pair of gate members hingedly connected to the upper ends of the last named columns respectively for swinging from an aligned closed position spanning the space between the columns to an open position, power means controllable from a remote point connected to the gate members to swing them, a sleeve slidably mounted on one of the gate members and slidable over the end of the other gate member to hold the gate members in aligned position, power means controllable from a remote point to slide the sleeve, cooperating latch parts on the sleeve and said other gate member to latch the sleeve against movement, and power means controllable from a remote point to disengage the latch parts so that the sleeve can be slid.

2. A boat hoist apparatus comprising a pair of spaced parallel frame side members, wheels supporting the side members for movement over the ground, a fixed gantry carried by the side members adjacent to one end thereof and including a pair of upright columns connected by a top beam, hoist devices carried by the gantry adjacent to the juncture of the columns and top beam, a pair of upright columns connected to the side members respectively adjacent to the other ends thereof, hoist devices carried by the last named columns at their upper ends, a pair of gate members hingedly connected to the upper ends of the last named columns respectively for swinging from an aligned closed position spanning the space between the columns to an open position, a rock lever hinged on the upper end of each of the last named col-

umns on an axis parallel to and spaced from the hinge axis of the adjacent gate member, a link connecting each rock lever to the adjacent gate member, a power cylinder connected to each rock lever to turn it about its axis, and a tubular sleeve slidably mounted on one of the gate members and slidable over the end of the other gate member when the gate members are in aligned position to hold them in alignment.

3. The boat hoist apparatus of claim 2 including adjustable stops at the upper ends of the last named columns to engage the rock levers and limit further turning thereof when the gate members are aligned.

4. The boat hoist apparatus of claim 2 including power means connected to the sleeve to slide it.

5. The boat hoist apparatus of claim 4 including cooperating latch parts on the sleeve and one of the gate members to latch the sleeve against movement, and remotely controllable means to release the latch parts so that the sleeve can be moved.

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