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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Log Transporting Vessel

I, THOMAS TRYGVE LUNDE, a Citizen of the United States of America of 233, Cervantes Boulevard, San Francisco, California, United States of America, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 This invention relates to vessels for transporting logs, such as a log barge. The invention is more particularly directed to an improvement in vessels capable of transporting logs long distances over open seas.

15 The present invention involves a log barge or vessel for transporting logs which may be easily loaded or unloaded and which lends itself to a high speed hull design. The vessel comprises a buoyant hull defining a flooded enclosure having a rigid submerged log-supporting surface and including a gate, the lower portion of said gate being below the unloaded water line and the upper edge of said gate being above the maximum load water line.

25 Although the supporting surface may support part of the weight of logs contained within the enclosure, by far the greatest portion of the weight is supported by the buoyancy of the logs themselves.

30 The gate is preferably mounted with its lower portion below the unloaded water line, the upper edge of the gate being above the maximum load water line. A further feature is that means for releasably latching the gate in an inclined position is provided to support logs thereon and to retain logs in the enclosure during their transportation.

40 Yet another feature includes the use of a plurality of lines, which can be used for leveling a load of logs within the enclosure of moving the logs toward the gate. By locating the gate at the stern end and extending the lines longitudinally of the vessel, the logs may be grouped into lots or bundles for separate

discharge as well as providing means for moving the logs toward a common gate.

Ballast means may be included for trimming the vessel as it is unloaded, thereby maintaining the lower edge of the gate below the unloaded water line as logs are discharged from the enclosure.

Another feature of the invention is to be found in the use of a floating bottom wall comprised of foamed polychemicals, such as polyurethane, sandwiched between inner and outer tank plates. Wall structures of this type obviate the need of painting the interior surfaces of the tank plates. Therefore, the surface of the plates may be much shallower than would otherwise be possible, resulting in definite savings in storage space. And, because the exterior water loading on the plates is continuously supported, large plate spans may be used and the plates themselves may be relatively thin. These advantages are exceedingly important to the practical construction and use of a flooded enclosure of the type contemplated.

Another feature is the provision of auxiliary discharge ports located at the unloaded water line of the vessel and remote from the gate. Such auxiliary discharge ports permit the removal of logs through the sides of the vessel during the final stage of unloading.

Other features and advantages of this invention will become apparent in view of the following detailed description and the accompanying drawings.

In the drawings forming a part of this application, and in which like parts are identified by like reference numerals throughout the same:

Figure 1 is a substantially side elevation of a vessel for transporting logs constructed in accordance with this invention;

Figure 2 is a broken longitudinal section of the vessel showing stern and bow portions in detail;

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Figure 3 is an enlarged vertical section through one side of the vessel as taken on line 3—3 of Figure 1;

Figure 4 is an enlarged detail section of the bottom wall as taken on line 4—4 of Figure 3; and

Figures 5 and 6 schematically illustrate stern trimming of the vessel by flooding a ballast tank.

Referring to Figures 1 and 2 in particular, there is shown a vessel 10 made in accordance with the invention and capable of being used for transporting logs on the ocean. Vessel 10, as shown, is constructed as a barge having a flooded enclosure that is essentially defined by stern and bow sections 11 and 12, a rigid submerged log-supporting surface 13 and a pair of buoyant side walls 14. The side walls are interconnected by a plurality of hollow transverse bottom girders 15 and upper transverse tie girders 16. It is contemplated that side walls of the vessel should extend above the unloaded water line, and that a timber fence 17 can be used for retaining logs thereabove.

A gate 18 is provided in the stern end section 11, said gate being hinged on a horizontal axis 19. Axis 19 is located below the unloaded water line a distance sufficient to allow the floating of logs from the flooded enclosure of the vessel. While logs are being transported, gate 18 is supported in an inclined position by a releasable latching means 20. The latching means may be one of a conventional kind, but it should be releasable although under load. A mechanism which is particularly suitable for this purpose is shown and described in United States Patent No. 2,927,550.

It will be apparent that so long as gate 18 is supported in its inclined position, it retains the logs in the enclosures, but upon release of the latching mechanism the upper edge of the gate takes a position below the unloaded water line, allowing the logs supported thereon to be dumped from the vessel and initiating a flow of logs from the enclosure. It is especially contemplated that an aft chain 21 can be used to help initiate the flow of logs from the stern section 11. One end of chain 21 is connected to a transverse girder 22, the other end being connected to the piston of a hydraulic motor 23 that is automatically actuated upon release of latching mechanism 20 which supports gate 18.

Vessel 10 is provided with other chains or lines 24 to assist unloading and to maintain a flow of logs from points amidship and in the bow section toward the stern end and gate 18. Chains 24, or flexible lines, also function as means for levelling a load of logs, and they can be used to segregate the logs into lots to allow a separate and partial discharge of logs from the vessel. It will be seen that each chain or flexible line extends forward

from a point near surface 13 where it is attached to one of the transverse girders 15. Each chain partially encircles a group of logs which is generally forward relative to the points of attachment. The upper ends of chains 24 are adapted to be connected to winding drums not shown. Winding drums driven by hydraulic motors may be mounted to upper girders 16 as required, and it is contemplated that each group of logs be encircled by a plurality of chains 24 connected to a common girder but to separate winding drums mounted on a common shaft.

In addition to chains 24, one or more chains 25 may be provided which extend the entire length of the vessel. These chains may also be operated by a drum, preferably mounted in the vicinity of the discharge gate 18 for clearing out the entire enclosure.

As an added feature, which may be used as an alternative means for removing floating logs, vessel 10 may be formed with one or more auxiliary discharge ports 26 as shown in Figures 1 and 3. These discharge ports are employed to speed up the unloading process and they may be located at predetermined water lines, and at several locations along the length of the vessel. The sides of each opening must accommodate the maximum log diameter in the cargo; and an additional allowance of 25% is desirable. It will be noted that the opening 26 is tapered outward and becomes largest on the side of the enclosure, thereby providing a guide for receiving one end of a log. A pair of covers 27 and 28 are used to close over openings 26 while logs are being transported. The covers serve to streamline the sides and avoid unnecessary turbulence that would impede movement of the vessel. Covers 27 and 28 may be removably mounted to the sides 14 by any conventional means, such as by providing retainer strips on the bottom and sides of the opening. The cover plates may then be positioned in front of the opening by simply lowering each plate while sliding it under the edges of the retainer strips.

An important feature of the invention is the use of a buoyant bottom wall comprised of a foamed polychemical 29, such as polyurethane, sandwiched between a pair of tank plates 30 and 31. Wall structure such as this can be prepared by supporting the plates 30 and 31 in spaced relation; the polychemical is then inserted between the plates as a liquid. Chemical action, in the well-known manner, causes the liquid to foam and form a rigid type product.

Referring to Figure 4, the bottom wall is preferably formed with a plurality of ports 32 spaced and sized as required for allowing a free flow of water into and from the enclosure. Each of the ports 32 can be provided in the bottom wall 13 by placing a standard pipe section through aligned openings in plates 30, 31. The pipe sections are preferably

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mounted to the plates prior to inserting the liquid foaming agent, then the expanded foam will bind itself to the pipe section also.

5 A bottom wall of the kind described and shown is of particular utility, not only because of its buoyant character, but also because it obviates the need of painting the inside of the wall plates 30, 31. A crawl space is usually required between a pair of bottom plates, such as 30, and 31, to permit painting of their interior surfaces. However, filling the void space between the plates with a rigid foam that seals itself to the surface of the plates prevents rusting and, therefore, obviates the need of painting. Consequently, plates 30 and 10 15 31 can be spaced a distance much less than ordinarily required for a crawl space, thereby increasing the cargo space above the bottom wall 13.

20 The stern section 11 of vessel 10 is formed with a pair of port and starboard ballast tanks 33. These tanks are used for trimming the vessel as it is unloaded, the need for which will be more readily apparent in view of 25 Figures 5 and 6. Figure 5 illustrates what would normally happen if vessel 10 was partly unloaded leaving a stack of logs in the bow section 12. Although the majority of the weight of the logs is supported by the buoyancy of submerged logs, that portion of the weight which is supported by the vessel might lower the bow section excessively, raising gate 18 above the existing water line and preventing a rearward discharge of logs from the enclosure. The problem is solved, however, by 35 flooding the ballast tanks 33, thereby increasing the weight at the stern end and trimming the vessel. It is also contemplated that the ballast tanks 33 may be used to lower the stern section 11 to assist movement of logs toward gate 18 as well as the discharge of logs from the enclosure.

40 Vessel 10, as described, requires the use of some independent means for moving it over the water. For example, the vessel may be towed or, alternatively, a pusher tug may be used in the lash-up system described in the United States Patent No, 2,984,202. It is clearly contemplated, however, that vessel 10 50 may be constructed as a self-powered vessel if desired.

Although a preferred embodiment of the invention has been illustrated and described, various modifications and changes may be made 55 without departing from the invention or the scope of the attached claims.

WHAT I CLAIM IS:—

60 1. A vessel for transporting logs comprising a buoyant hull defining a flooded enclosure having a rigid submerged log-supporting surface and including a gate, the lower portion of said gate being below the unloaded water line and the upper edge of said gate being

above the maximum load water line.

2. A vessel as claimed in claim 1, wherein said gate is located at the stern end of said vessel. 65

3. A vessel as claimed in claims 1 or 2, including means for pivotally supporting the gate on a horizontal axis below the unloaded water line. 70

4. A vessel as claimed in any one of claims 1 to 3, including means for releasably latching said gate in an inclined position to support logs thereon and retain logs in the enclosure means, the upper edge of said gate taking a position below said unloaded water line when said latching means is released. 75

5. A vessel as claimed in any one of claims 1 to 4, further comprising discharge means for initiating a flow of logs from said enclosure at points remote from said gate. 80

6. A vessel as claimed in claim 5, wherein the said discharge means comprises at least one flexible line secured near said supporting surface, said line extending forward along said surface and then upward as to partially encircle a group of logs. 85

7. A vessel as claimed in any one of claims 1 to 6, further comprising levelling means for levelling a load of logs within said enclosure means and moving logs toward said gate. 90

8. A vessel as claimed in claim 7, wherein said levelling means comprises a plurality of flexible lines, one end of each line being secured to said supporting surface and extending forward along said surface and then upward and partially around a group of logs, said lines being secured at different points longitudinally of said vessel and partially encircling a group of logs different from the group partially encircled by other lines. 95 100

9. A vessel as claimed in any one of claims 1 to 8, further comprising ballast means for trimming said vessel as it is unloaded. 105

10. A vessel as claimed in claim 9, wherein the said ballast means comprises a ballast tank, and means for selectively filling and discharging said ballast tank with water to lower the stern of said vessel. 110

11. A vessel as claimed in any one of claims 1 to 10, wherein said buoyant enclosure means comprises a bottom wall made of foamed polychemicals sandwiched between inner and outer plates. 115

12. A vessel as claimed in any one of claims 1 to 11, wherein said enclosure means is provided with auxiliary discharge ports located at predetermined water lines of said vessel. 120

13. A vessel as claimed in claim 12, wherein said discharged ports are located at the unloaded water line of said vessel for discharging logs therefrom. 125

14. A vessel for transporting logs and the like substantially as herein described with reference to the accompanying drawings.

levelling

mounted to the plates prior to inserting the liquid foaming agent, then the expanded foam will bind itself to the pipe section also.

A bottom wall of the kind described and shown is of particular utility, not only because of its buoyant character, but also because it obviates the need of painting the inside of the wall plates 30, 31. A crawl space is usually required between a pair of bottom plates, such as 30, and 31, to permit painting of their interior surfaces. However, filling the void space between the plates with a rigid foam that seals itself to the surface of the plates prevents rusting and, therefore, obviates the need of painting. Consequently, plates 30 and 31 can be spaced a distance much less than ordinarily required for a crawl space, thereby increasing the cargo space above the bottom wall 13.

The stern section 11 of vessel 10 is formed with a pair of port and starboard ballast tanks 33. These tanks are used for trimming the vessel as it is unloaded, the need for which will be more readily apparent in view of Figures 5 and 6. Figure 5 illustrates what would normally happen if vessel 10 was partly unloaded leaving a stack of logs in the bow section 12. Although the majority of the weight of the logs is supported by the buoyancy of submerged logs, that portion of the weight which is supported by the vessel might lower the bow section excessively, raising gate 18 above the existing water line and preventing a rearward discharge of logs from the enclosure. The problem is solved, however, by flooding the ballast tanks 33, thereby increasing the weight at the stern end and trimming the vessel. It is also contemplated that the ballast tanks 33 may be used to lower the stern section 11 to assist movement of logs toward gate 18 as well as the discharge of logs from the enclosure.

Vessel 10, as described, requires the use of some independent means for moving it over the water. For example, the vessel may be towed or, alternatively, a pusher tug may be used in the lash-up system described in the United States Patent No. 2,984,202. It is clearly contemplated, however, that vessel 10 may be constructed as a self-powered vessel if desired.

Although a preferred embodiment of the invention has been illustrated and described, various modifications and changes may be made without departing from the invention or the scope of the attached claims.

WHAT I CLAIM IS:—

1. A vessel for transporting logs comprising a buoyant hull defining a flooded enclosure having a rigid submerged log-supporting surface and including a gate, the lower portion of said gate being below the unloaded water line and the upper edge of said gate being

above the maximum load water line.

2. A vessel as claimed in claim 1, wherein said gate is located at the stern end of said vessel.

3. A vessel as claimed in claims 1 or 2, including means for pivotally supporting the gate on a horizontal axis below the unloaded water line.

4. A vessel as claimed in any one of claims 1 to 3, including means for releasably latching said gate in an inclined position to support logs thereon and retain logs in the enclosure means, the upper edge of said gate taking a position below said unloaded water line when said latching means is released.

5. A vessel as claimed in any one of claims 1 to 4, further comprising discharge means for initiating a flow of logs from said enclosure at points remote from said gate.

6. A vessel as claimed in claim 5, wherein the said discharge means comprises at least one flexible line secured near said supporting surface, said line extending forward along said surface and then upward as to partially encircle a group of logs.

7. A vessel as claimed in any one of claims 1 to 6, further comprising levelling means for levelling a load of logs within said enclosure means and moving logs toward said gate.

8. A vessel as claimed in claim 7, wherein said levelling means comprises a plurality of flexible lines, one end of each line being secured to said supporting surface and extending forward along said surface and then upward and partially around a group of logs, said lines being secured at different points longitudinally of said vessel and partially encircling a group of logs different from the group partially encircled by other lines.

9. A vessel as claimed in any one of claims 1 to 8, further comprising ballast means for trimming said vessel as it is unloaded.

10. A vessel as claimed in claim 9, wherein the said ballast means comprises a ballast tank, and means for selectively filling and discharging said ballast tank with water to lower the stern of said vessel.

11. A vessel as claimed in any one of claims 1 to 10, wherein said buoyant enclosure means comprises a bottom wall made of foamed polychemicals sandwiched between inner and outer plates.

12. A vessel as claimed in any one of claims 1 to 11, wherein said enclosure means is provided with auxiliary discharge ports located at predetermined water lines of said vessel.

13. A vessel as claimed in claim 12, wherein said discharged ports are located at the unloaded water line of said vessel for discharging logs therefrom.

14. A vessel for transporting logs and the like substantially as herein described with reference to the accompanying drawings.

levelling



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