United States Patent [19]

Rivet

[11] **3,842,785**

[45] **Oct. 22, 1974**

[54] **AMPHIBIOUS MARSH CRAFT**

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[52] **U.S. Cl.** ..... **115/1 R,** 115/63, 305/25

[51] **Int. Cl.** **B60f 3/00**

[58] **Field of Search** ..... 115/1 R, 63; 114/66.5 F, 114/.5 F; 305/24, 25, 16; 416/7

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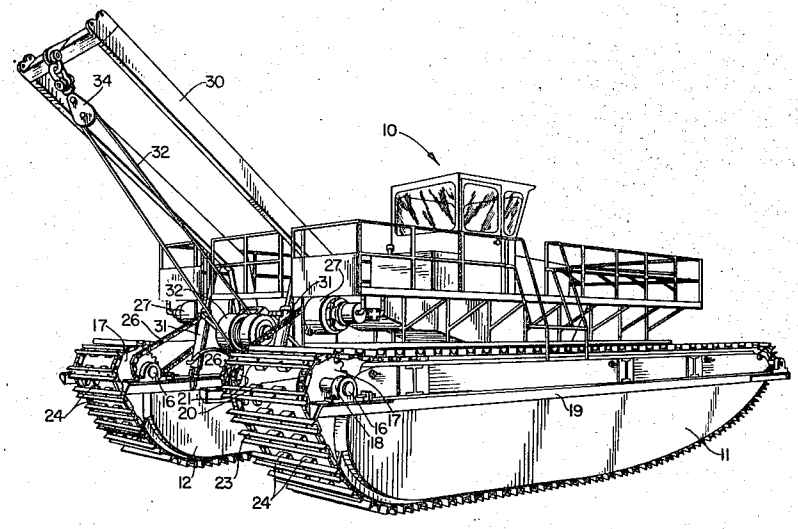
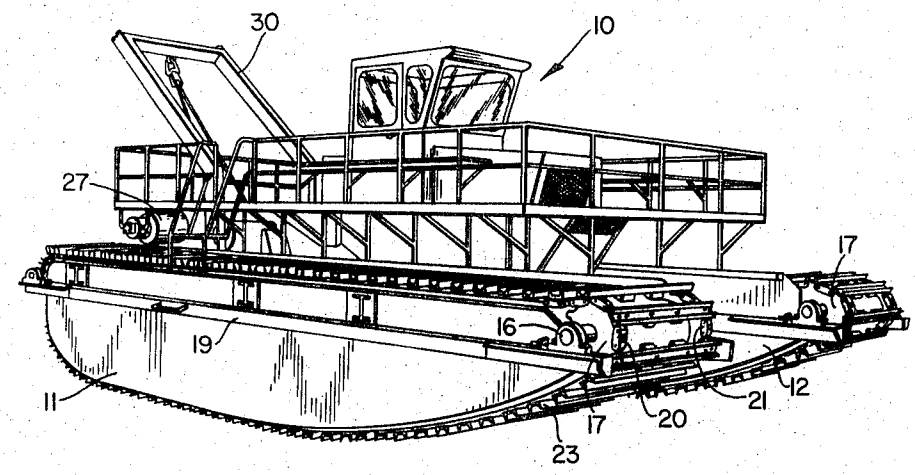
Assistant Examiner—Edward R. Kazenske
Attorney, Agent, or Firm—Wilkinson, Mawhinney & Theibault

[57] **ABSTRACT**

The present disclosure is directed to an amphibious marsh craft having specially constructed pontoons which not only act as buoyancy chambers but which due to the use of bulkheads are divided into a plurality of chambers to protect the dragline or other work device carried on the vehicle from sinking should a plate become punctured and the pontoon flood. With the bulkheads reserve buoyancy is present. The use of transversely disposed I-beams on the bottom of the pontoon cooperates with the bulkheads to make a rigid frame resistant to twisting, bucking or breaking.

7 Claims, 8 Drawing Figures




30
10
27
17
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16
11
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12
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20
23

FIG. 1

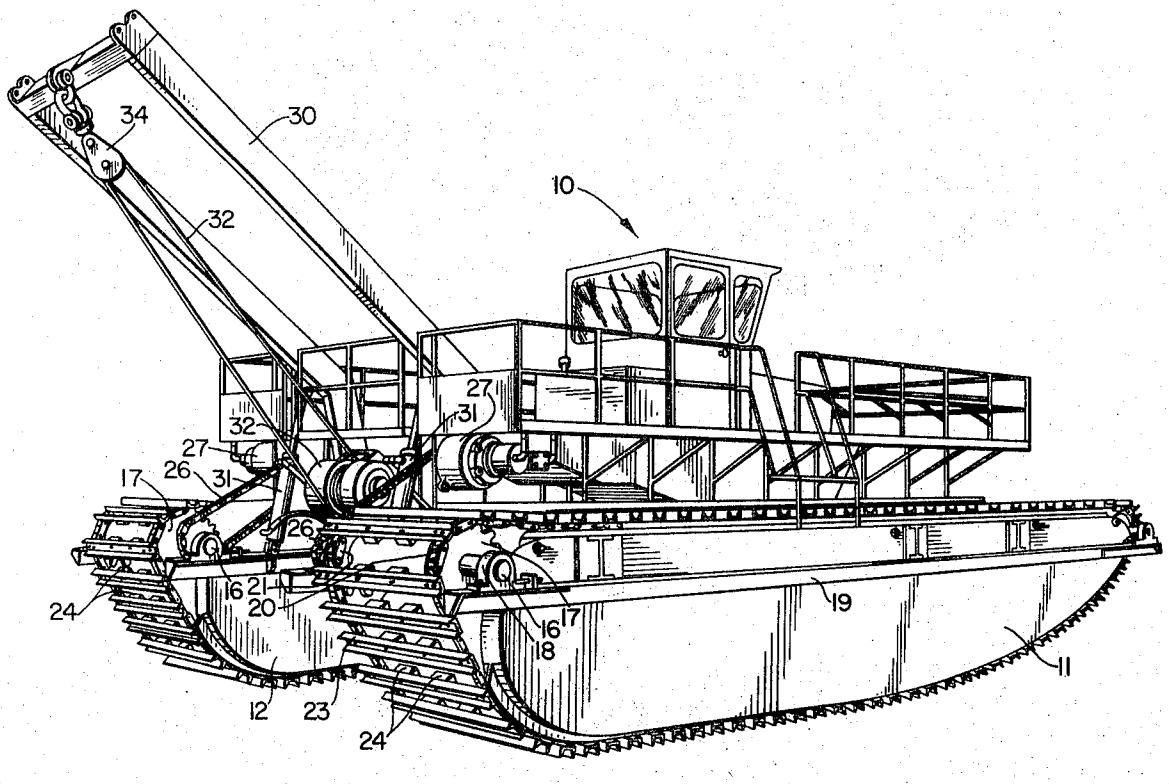
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FIG. 2

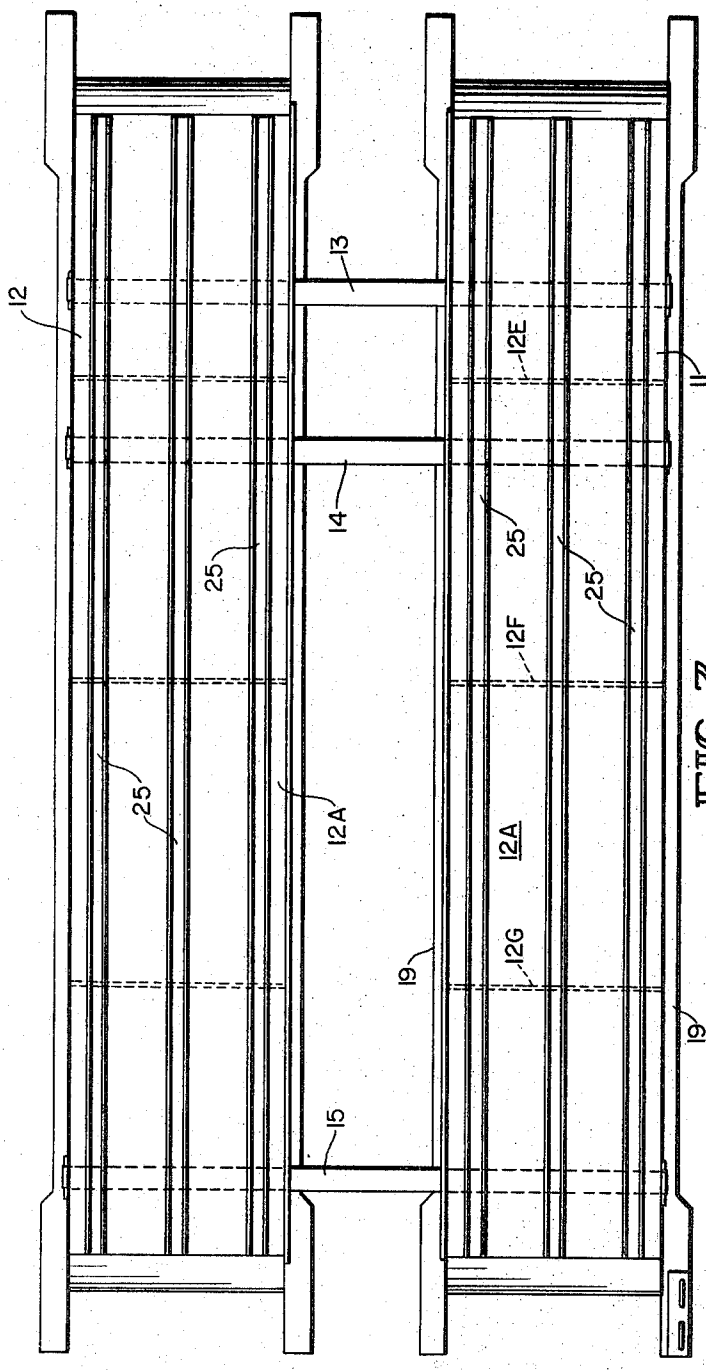
12
13
12E
11
14
25
25
25
25
12F
12A
12A
19
12G
19
15

FIG. 3

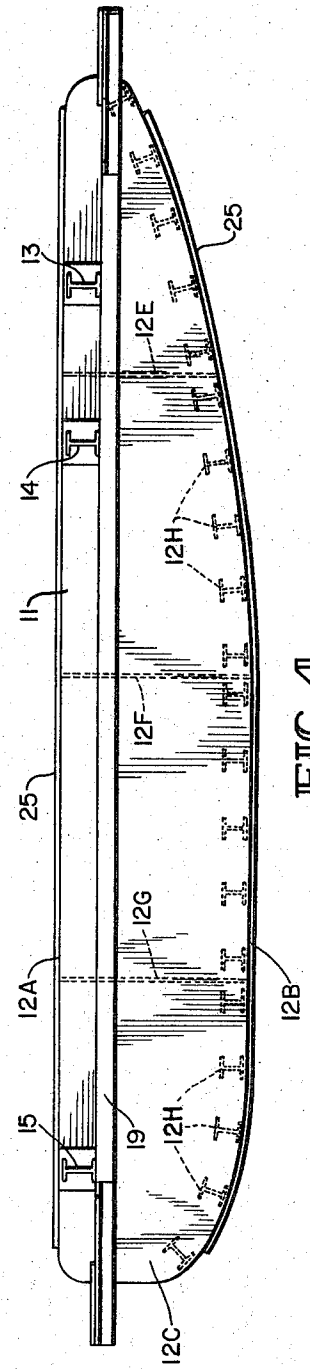
13
25
12E
14
12H
11
12F
25
12G
12A
12B
15
19
12H
12C

FIG. 4

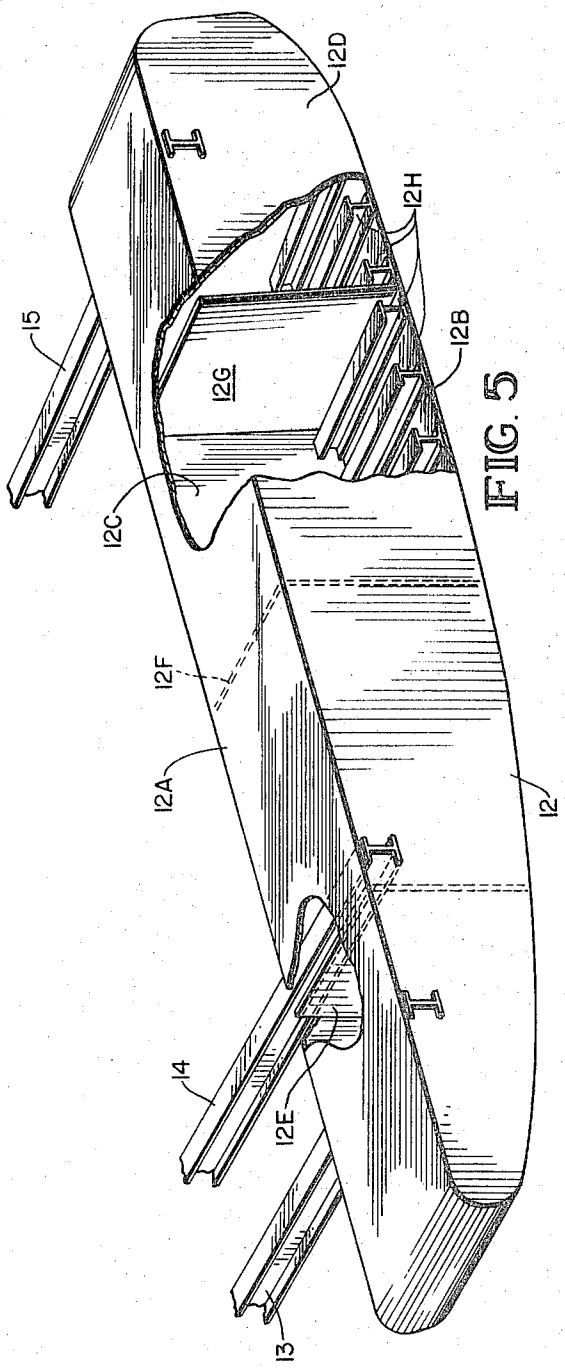

FIG. 5

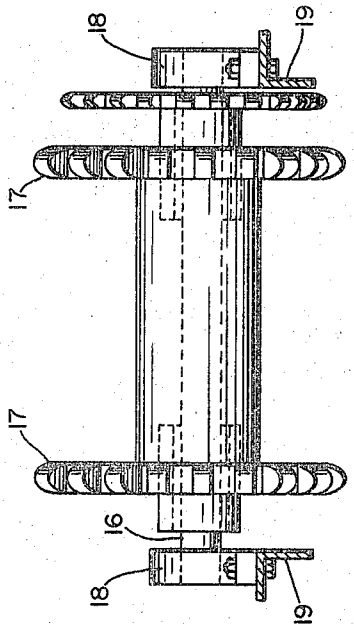

FIG. 7

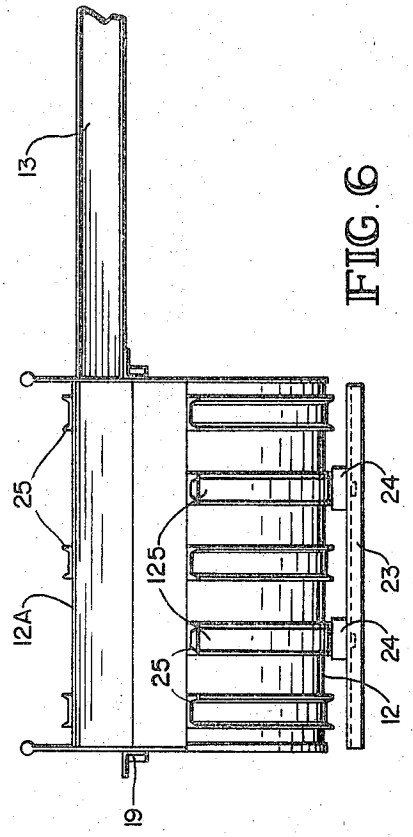

FIG. 6

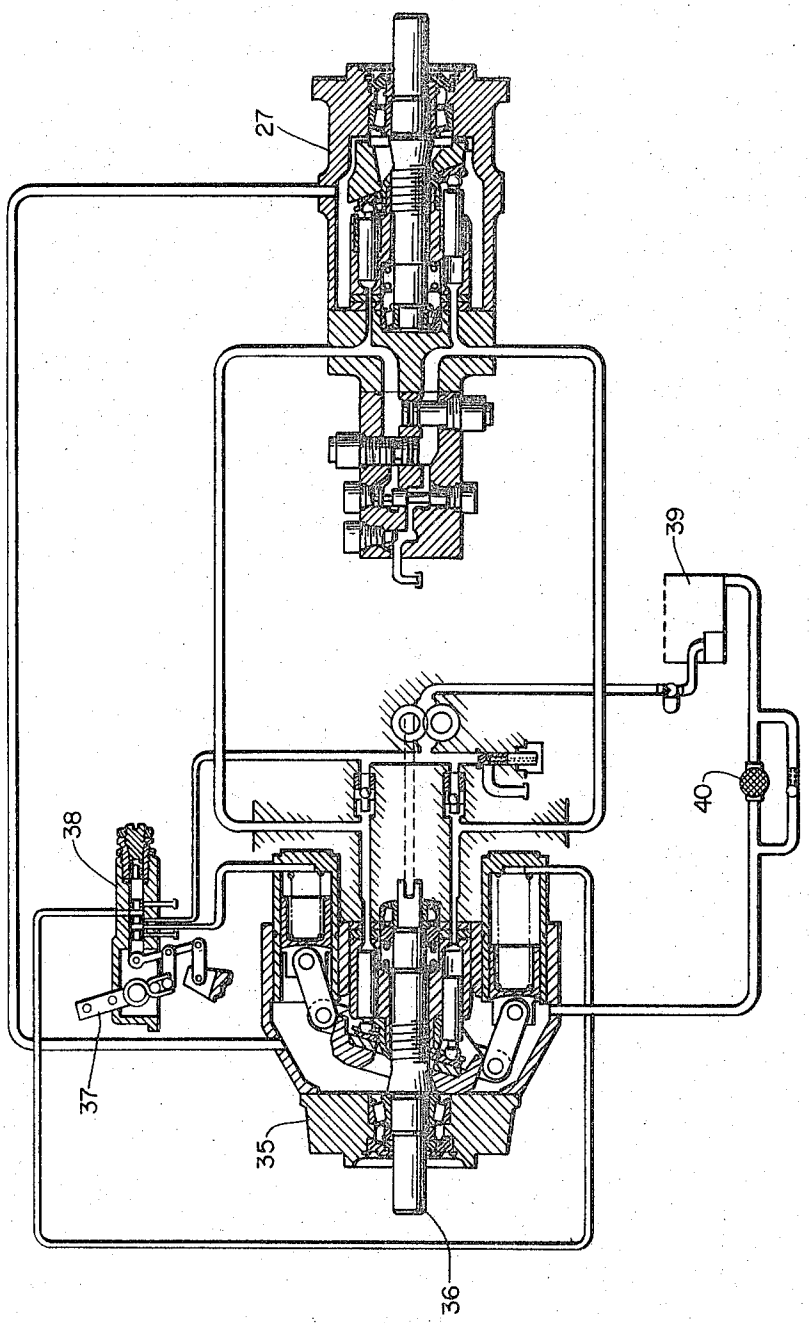

FIG. 8

AMPHIBIOUS MARSH CRAFT

An object of the present invention is to provide an amphibious craft more compact, structurally stronger and having a higher watertight integrity than the type of craft shown in U.S. Pat. No. 2,546,523 and U.S. Pat. No. 3,418,961 which because of unitized all-welded construction which is, in the pontoon area, reinforced with vertical bulkheads, and transversely positioned I-beams will resist moments of force which cause other vehicles of the type shown in the above patents to twist, buckle or be subjected to torsional stresses which will open welds on the pontoon causing flooding and loss of buoyancy of the craft.

A further object of the present invention is the provision of a pontoon type endless track vehicle which will support and carry into swamps, marshes and other inaccessible areas heavy loads such as draglines, hydraulic tree cutters, equipment moving A-frames for transporting loads up to sixty tons without fear of losing the load due to a loss of buoyancy or buckling of the buoyant pontoon and the inability of the endless track drive to move the vehicle and its work load over tree stumps, marshes, water or soft land in which other vehicles become bogged down and cannot operate.

A still further object of the present invention is a vehicle having pontoon buoyant supports about which move endless drive chains having cleats connected between a pair of chains which move with a minimum amount of friction requiring less driving horsepower and which has plastic blocks of a low coefficient of friction which not only act as friction reducers but as support members between the cleats and pontoon resulting in little or no buckling of the traction cleats between their drive chain attachments.

A still further object of the present invention is the provision of a pontoon craft of the type described which is provided on its top and bottom of each pontoon with low coefficient of friction plastic material which cooperates with plastic blocks to reduce wear and horsepower necessary to move the vehicle and its work load into and out of inaccessible places whether it be solid land, marsh and/or water or a combination of any of the foregoing.

An object of the present invention is the provision of a pontoon vehicle having endless tracks running over the top and bottom of the pontoon wherein the pontoon at its leading end has an undercut nose which will permit the vehicle and its work load to rock and absorb various shocks incident to terrain changes or tree stumps or foreign objects which would otherwise impose sudden shock moments on the pontoons resulting in breaking of weldments in the pontoon causing a loss of buoyancy necessary to support such work loads as drag lines, hydraulic tree cutters, etc.

With the foregoing and other objects in view the invention will be more fully described hereinafter and more particularly pointed out in the appended claims.

In the drawings in which like parts are denoted by reference characters throughout the several views:

FIG. 1 is a front perspective view of one form of amphibious pontoon endless track vehicle constructed in accordance with the present invention.

FIG. 2 is a rear perspective view of the vehicle of FIG. 1.

FIG. 3 is a top plan view of the pontoon and joining structure of the vehicle of FIGS. 1 and 2.

FIG. 4 is a side elevational view of the pontoon structure of the present invention.

FIG. 5 is a perspective view with parts broken away showing the reinforcing and buoyancy structure of a pontoon constructed in accordance with the present invention.

FIG. 6 is a fragmentary front elevational view of one of the pontoons and driving cleats showing the support blocks bearing against the plastic filled channels.

FIG. 7 is a front elevational view of the endless track support shaft showing the free floating bearing support of the drive sprocket shafts.

FIG. 8 is a diagramatic hydraulic schematic of one of the pontoon endless track drive systems.

Referring now to the drawings, 10 designates an amphibious craft constructed in accordance with the present invention having pontoons 11 and 12 maintained in parallelism by I-beams 13, 14, and 15 welded to the pontoons. At each end of each pontoon are shafts 16 having drive sprockets 17 thereon, best seen in FIG. 7. Each shaft is journaled in bearings 18 secured to angles 19 welded to the pontoons 11 and 12 proximate the upper portion thereof. About the sprockets 17 are roved endless chains 20, 21 between which are secured cleats 23 in the form of channels with the upstanding flanges directed away from the pontoons. Between the endless chains 20, 21 are support blocks 24 secured to the webs of the channels so that they will bear against either the top or bottom of the pontoon or a channel 25 filled with a low coefficient of friction plastic 125 such as an epoxy, teflon or nylon to act as a frictionless wear surface over which the support blocks 24 which may be of polypropylene to reduce both wear and friction.

The endless track is driven from the rear shaft, FIG. 7, which has a drive sprocket keyed thereto and which is itself driven by a chain 26 driven from a hydraulic motor 27, one drive motor for each pontoon.

PONTOON CONSTRUCTION

Referring now to FIGS. 3 through 6 the construction of the pontoons will be described with reference in detail to only one since both are identical. The pontoon 12 has a top 12A, a bottom 12B, and side walls 12C and 12D. The interior of the pontoon is divided into a plurality of water tight buoyancy chambers by bulkheads 12E, 12F, and 12G which are welded to the sides and bottom plates. The bulkheads add structural strength to the pontoon as well as a buoyancy chamber wall. Along the bottom of the pontoon 12B are a plurality of I-beams 12H running transversely of the major axis of the pontoon and welded to the bottom plate 12B. The combination of bulkheads and the I-beams together with the longitudinal channels 25 on the top and bottom of each pontoon provide a rugged structure resistant to bending, buckling, twisting or cracking of plate weldments, a unique feature which permits the vehicle of the present invention to operate prolonged periods of time without damage to its structure.

The longitudinal channels 25 form both runways for the endless chains 20, 21 to which the track cleats 23 are secured and the support blocks 24 over the middle area of the cleat act as a frictionless load bearing surface to reduce both wear and horsepower requirements necessary to drive the vehicle.

The pontoon structure described cooperates with the unitized welded beam construction of beams **13, 14,** and **15** to provide a rugged buoyant structure which can support in water, marsh or land loads of up to 60 tons which permits the mounting on the top of the pontoon structure of drag lines, tree cutters and other heavy duty construction equipment.

The under cut nose portion of the front of the pontoon as best seen in FIG. **4** is attained by bulkhead **12E** being of lesser vertical height. The major load bearing portion of the pontoon being from bulkhead **12F** to the rear. The rocker-like construction afforded by the undercut leading nose permits the vehicle to climb over obstacles such as tree stumps and ditches, levies and banks, and upon returning to a level running surface to rock back to a stable running attitude.

The embodiment shown in FIGS. **1** and **2** is equipped to transport personnel and has a 50-ton lift in the form of a U-frame **30** pivoted to the main frame and raised and lowered by hydraulic cylinders **31.** A winch **32** has a cable **33** passing through pulley **34** and a hook or other work attaching device is provided on the cables free end.

The propulsion mechanism for the vehicle is a pair of fixed displacement hydraulic motors **27** and the control system of only one motor is shown in FIG. **8** since both are identical. The drive from a diesel or gasoline prime mover is connected to a reversible variable displacement pump **35** at **36.** A control handle **37** on a displacement control valve **38** controls direction and quantity of oil flow to the drive motors **27.** The system is provided with a resevoir **39** and heat exchanger **40.** There are two separate control handles **37** and systems, one to drive each pontoon independently of one another or together.

With the pontoons being transversely spaced 2 ½ to 5 feet apart a very small or tight turning circle is attained when one pontoon is stopped and the other driven.

What I claim:

1. An amphibious craft comprising a pair of spaced elongated pontoons, each pontoon comprising a primary buoyant closed wall structure having a top and bottom and having a substantially uniform vertical height over at least half its length measured from rear to front, vertical bulkheads spaced along the length of said pontoons adding rigidity to the pontoon and defining a plurality of separate buoyant chambers within the pontoon, a plurality of spaced I-beams welded to the bottom of the pontoons transversely of the pontoons between said vertical bulkheads over the length of said pontoon, at least two primary channel means on the top and bottom of the pontoon, endless drive chains carried in each of said channel means, channel shaped drive cleats secured to and extending between said chains, plastic support blocks secured to the web of said cleats intermediate the drive chains and positioned to bear against the top and bottom of each pontoon, drive means for driving said endless chains, and I-beam spacer means welded to said pontoons at the top of and rigidly interconnecting said pontoons fore and aft in substantially parallel relation.

2. An amphibious craft as claimed in claim **1** further comprising secondary channel means intermediate said primary channel means on the pontoons running longitudinally along the top and bottom of each pontoon with the flanges directed outwardly, the area between said flanges on the channels being filled with a low coefficient of friction plastic material against which the plastic support blocks on said cleats will bear and slide.

3. An amphibious craft as claimed in claim **2** wherein said plastic support blocks are of a low coefficient of friction plastic.

4. An amphibious craft as claimed in claim **3** further comprising endless drive chain sprockets secured to shafts mounted proximate the top of each pontoon in a free floating bearing assembly said endless drive chains meshing with said sprockets and being drivingly connected to said drive means.

5. An amphibious craft as claimed in claim **4** wherein said drive means is a separate hydraulic motor for driving the endless tracks of each pontoon.

6. For use with an amphibious craft having a pair of spaced elongated pontoons over which pass endless track propulsion members having channel shaped driving cleats with the side flanges directed away from the pontoons, an anti-friction load transfer system comprising at least one longitudinal channel member secured to the underside of the pontoon with its flanges directed away from the pontoon, plastic filler between said flanges, and plastic support blocks secured to the back side of said cleats over the plastic filler in the longitudinal channels on the underside of the pontoons to provide a load bearing surface having a minimum coefficient of friction between the pontoon and driving cleats.

7. An anti-friction load transfer system as claimed in claim **6** wherein the plastic filler and plastic blocks are of the group of epoxy, teflon, nylon and polypropylene.

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