United States Patent [19]

Taylor

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[54] **BARGE**

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Jan. 16, 1973 Canada 161329

[52] **U.S. Cl.** ..... **114/.5 F**

[51] **Int. Cl.** **B63g 35/00**

[58] **Field of Search** ..... 114/.5 F, 66.5 F, 74 R, 114/61; 9/1 R

[56] **References Cited**

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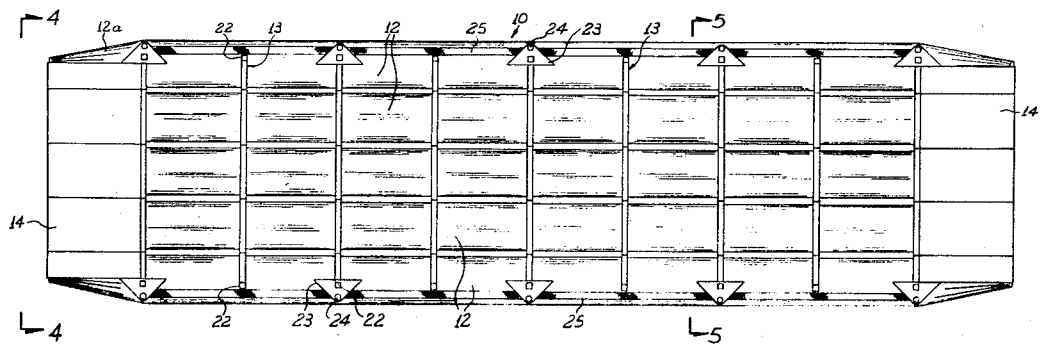
Primary Examiner—Trygve M. Blix

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[57] **ABSTRACT**

A barge has a plurality of parallel tubular pontoons connected together at longitudinally spaced planes by a set of transverse beams. Each beam is of integral construction and includes transversely aligned bulkheads within the pontoons and beam web plates on the outside of the pontoons in alignment with the bulkheads, the beam web plates of adjacent pontoons being secured together. The pontoons have closed, tapered end portions covered by deck plates, but between the deck plates at the ends, the deck of the barge is open. The bulkheads separate each pontoon into a plurality of watertight compartments.

7 Claims, 5 Drawing Figures



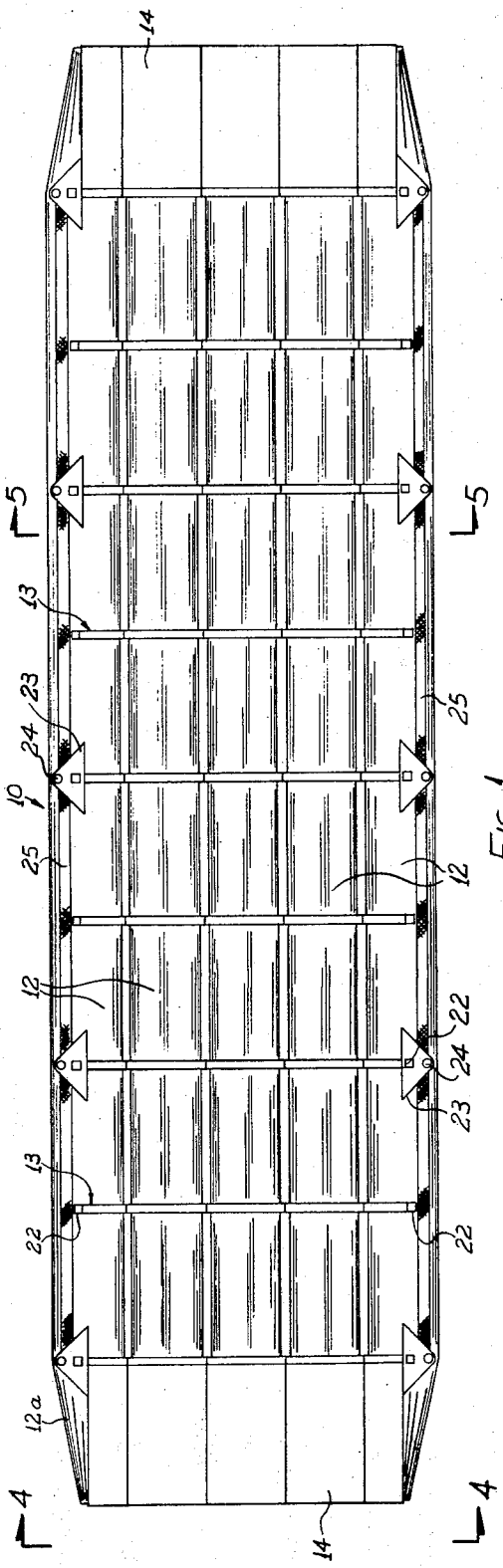


FIG. 1

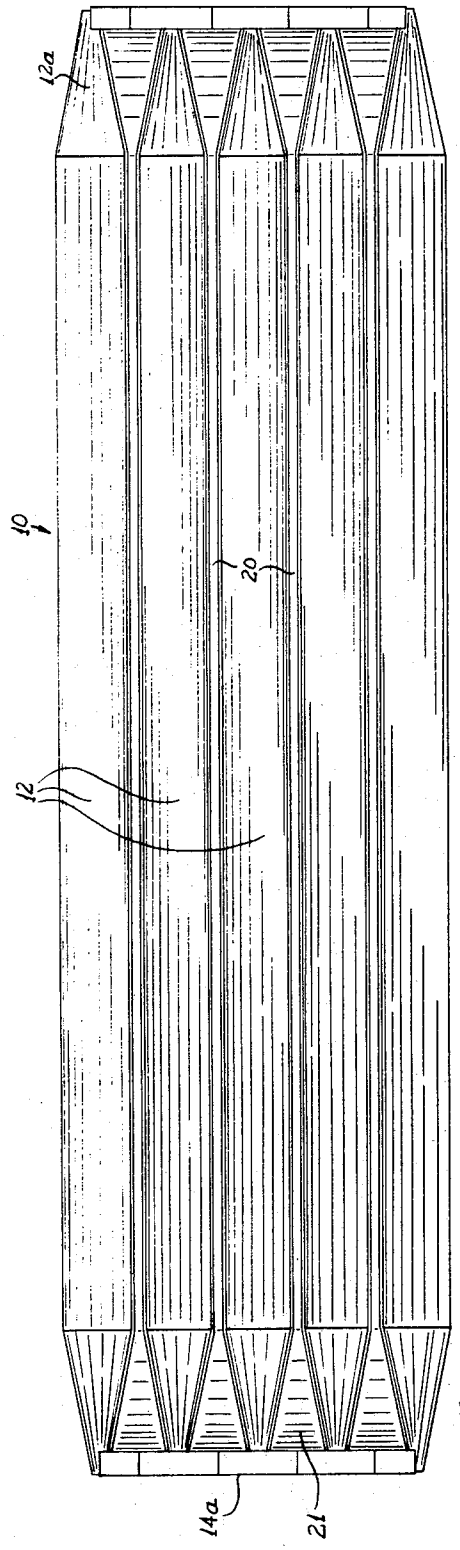


FIG. 2

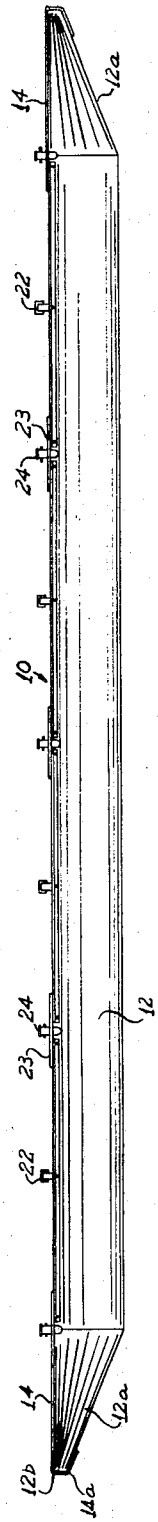


FIG. 3

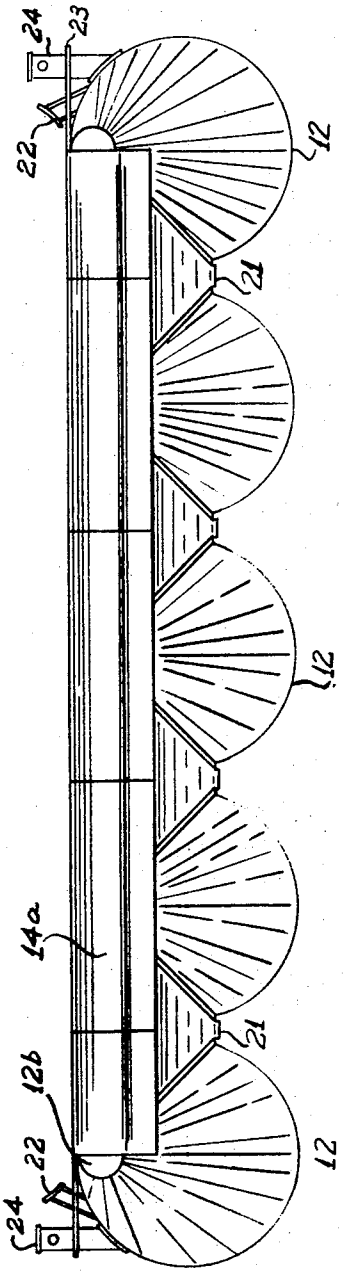

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14a
12b
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FIG. 4

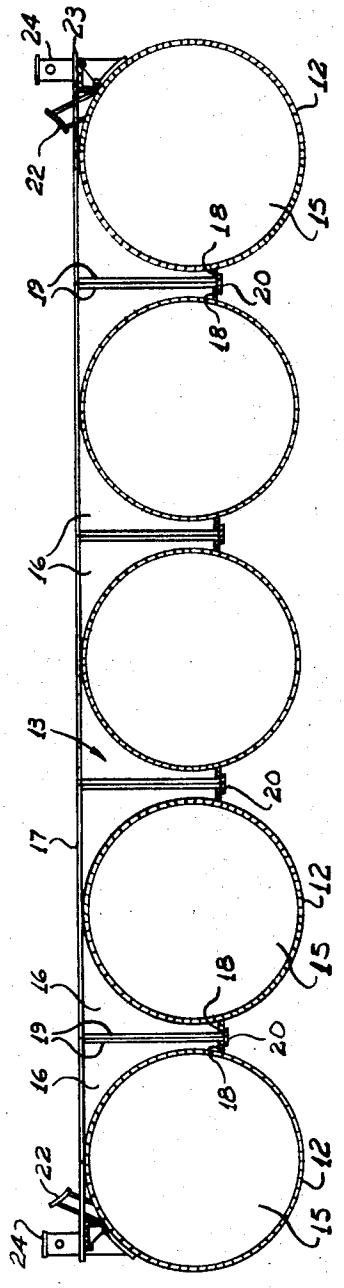

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FIG. 5

BARGE

This invention relates to new and useful improvements in barges, and in particular the invention concerns itself with a barge which is made up of a plurality of spaced, parallel tubular pontoons connected together at longitudinally spaced planes by a set of transverse beams.

The principal object of the invention is to provide a barge of this general type wherein the connecting beams are of a novel integral construction, affording considerable strength and rigidity in the transverse direction, while the tubular form of the pontoons themselves provides for longitudinal sturdiness, so that the need for conventional reinforcements or stiffeners within the pontoons is virtually eliminated.

The barge in accordance with the invention may have anywhere from two to seven or more pontoons secured together by the novel connecting beams. The pontoons have closed, tapered end portions covered by deck plates which are turned down and under the closed ends so that the pushing effort of a tug is distributed transversely across the several pontoons. Between the deck plates at the ends, the deck of the barge is open.

The barge is very simple in construction, economical to manufacture and is easily assembled. This may be done by welding the components together and launching the barge at the site of fabrication. Alternatively, the components may be made at one location and shipped for assembly at another. Also, in place of welding, the components may be connected together by bolts, particularly in instances where it may be desirable to disassemble the barge after use at one location and ship the componets for re-assembly at some other place.

The open deck barge is especially well suited for transportation of pipes used in the construction of pipe lines, although its pontoons may also be used for transport of liquid cargo.

With the foregoing more important object and features in view and such other objects and features which may become apparent as this specification proceeds, the invention will be understood from the following description taken in conjunction with the accompanying drawings, wherein like characters of reference designate like parts, and wherein:

FIG. 1 is a top plan view of a barge in accordance with the invention;

FIG. 2 is a bottom plan view thereof;

FIG. 3 is a side elevational view;

FIG. 4 is an end view, taken from the plane of the line 4—4 in FIG. 1; and

FIG. 5 is a cross-sectional view, taken substantially in the plane of the line 5—5 in FIG. 1.

Referring now to the accompanying drawings in detail, the barge is designated generally by the reference numeral 10 and comprises a plurality of spaced, parallel tubular pontoons 12. Anywhere from two to seven or more such pontoons may be provided, five being shown in the drawings. For maximum strength the pontoons have a true circular cross-section, although they may have a somewhat oval cross-section if so preferred.

The several pontoons are connected together at longitudinally spaced planes by a set of transverse beams

designated generally as 13, these being of a novel construction which will be hereinafter described.

The end portions of the pontoons, indicated at 12*a*, are tapered and slanted upwardly as will be apparent from FIg. 3, so that their tops are flush with the top of the main body of the pontoons. The end portions 12*a* are covered by deck plates 14 which are turned down and under the closed ends 12*b* of the tapered end portions. The downturned portions 14*a* of the deck plates in effect provide transverse rails at the ends of the barge, against which the pushing force of a tug may be applied and distributed transversely across the several pontoons, rather than being concentrated at one particular point or pontoon. Between the deck plates 14 on the end portions, the deck of the barge is open.

Each of the pontoon connecting, transverse beams 13 is of an integral construction and includes a plurality of transversely aligned bulkheads 15 provided within the respective pontoons 12, and sets of vertical beam web plates 16 provided on the outside of the pontoons in the spaces therebetween and in transverse alignment with the bulkheads. The upper edges of the web plates are flush with the top of the pontoons and horizontal strips 17 are secured to the upper edges of the web plates, extending transversely across the top of the pontoons, as will be apparent from FIGS. 1 and 5.

The web plates 16 are deep enough so that their lower edges preferably are disposed below the center of the pontoons, and these lower edges are provided with horizontal flanges 18 which are also secured to the pontoons themselves. The side edges of the adjacent web plates 16 are equipped with vertical flanges 19 which abut each other and are secured together, either by welding or by bolts. In addition, horizontal strips 20 underlie the flanges 18 at the lower edge of the web plates and are secured thereto, either by welding or by bolts. The strips 20 extend longitudinally between the adjacent pontoons along their entire length, with exception of the tapered end portions 12*a*, where the space between the end portions is filled by substantially triangular plates 21.

It will be apparent from the foregoing that each of the transverse beams 13 is a strong, integral unit consisting of the bulkheads 15, web plates 16, flanges 18, 19 and the strips 17, 20, with the flanges 19 of adjacent web plates secured together in abutting relation and the longitudinal strips 20 connecting the lower flanges 18 of the web plates. As such, the beams 13 are of a substantial vertical dimension and provide a remarkably rigid connection between the pontoons 12 in the transverse direction, while the tubular cross-section of the pontoons affords longitudinal strength.

As already noted, the barge is primarily intended for transportation of pipes such as are used in pipelines, these pipes being placed longitudinally along the open deck of the barge and stacked in a pyramidal fashion. The pipes at the outside of the lowermost row in the stack are prevented from outward lateral movement by pairs of retainers 22 which are secured to the outer side portion of the outermost pontoons 12 in the set and project above the ends of the transverse beam strips 17, as will be apparent from FIGS. 3, 4 and 5.

In addition, the strips 17 at the ends of some of the beams 13, as for example at every other beam, are equipped with triangular plate extensions 23 to support bollards 24 of conventional type, which may be used for mooring or side towing the barge. At these locations

the cargo retainers 22 may also project upwardly through the plate extensions 23.

Suitable catwalks or walkways 25 may be provided longitudinally along the outer sides of the outermost pontoons in the set, as shown in FIG. 1.

The bulkheads 15 of the several transverse beams 13 effectively separate each of the pontoons 12 into a plurality of individual compartments, and since the bulkheads are preferably watertight, they prevent the barge from sinking in the event that one or more of such compartments becomes flooded by damage to the pontoons, as upon contact with the water bottom or shore. Also, while the barge is primarily intended for transportation of pipes and the like, placed upon its open deck, it may also be used for transportation of liquid cargo within the individual compartments of the pontoons. To assure adequate floatation, such cargo may be lighter than water, or, if of the same or higher specific gravity, the compartments may be only partially filled.

As noted in the opening paragraphs of this specification, the various components of the barge may be fabricated and assembled, as by welding, at one location, as for example, on the bank of a river, the completed barge being launched at that point. On the other hand, the barge may be fabricated in sections at some location remote from water, each such section consisting of one pontoon with the associated portions of the transverse beams 13, whereupon the several sections may be shipped and assembled together, either by welding or by bolts, at another location where the barge is to be used. Moreover, the pontoons themselves, which may be as long as 250 feet or more, may be made of a plurality of individual tubular tanks secured together in end-to-end relationship to form each pontoon, the tanks either having closed ends or being otherwise partitioned to provide the required bulkheads in the assembled pontoons. Such a sectional construction would obviously avoid the necessity of shipping pontoons of full length from one place to another.

The barge may be of a substantial size, some 250 feet or more in length and 50 feet or more across the beam. The width may be kept reasonably constant regardless of the number of pontoons employed, by utilizing pontoons of a suitable diameter. While essentially not important to the actual barge structure itself, it is preferred that the ratio of the distance between the bulkheads in each pontoon to the pontoon diameter be approximately 1:3. Also, it is preferred that the ratio of the pontoon wall thickness in relation to the pontoon diameter be somewhere between 1:100 and 1:500 for effective strength.

While in the foregoing there has been described and claimed the preferred embodiment of the invention, various modifications and equivalents may be resorted to within the spirit and scope of the appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. In a barge, the combination of a plurality of spaced parallel substantially tubular pontoons, and a set of integral transverse beams connecting said pontoons together in planes spaced longitudinally along the barge, each of said beams being of an integral construction and including a plurality of transversely aligned bulkheads provided within the respective pontoons, and sets of vertical beam web plates provided on the outside of the pontoons in the spaces therebetween and in transverse alignment with said bulkheads, the beam web plates of adjacent pontoons abutting and being secured together.

2. The barge as defined in claim 1 wherein said beam web plates have upper flanges substantially flush with the top of the pontoons and lower flanges below the center of the pontoons.

3. The barge as defined in claim 1 together with vertical flanges provided on adjacent edges of said beam web plates, said flanges being secured together.

4. The barge as defined in claim 1 together with horizontal flanges provided at lower edges of said beam web plates, and horizontal strips extending longitudinally between said pontoons and connecting adjacent pontoons together.

5. The barge as defined in claim 1 wherein said pontoons have closed tapered end portions, and a pair of deck plates secured to the top of said tapered end portions at the respective ends of the barge, the barge being further characterized by having an open deck between said deck plates at its ends.

6. The barge as defined in claim 5 wherein said deck plates are turned downwardly and inwardly under the closed ends of said tapered pontoon end portions.

7. The barge as defined in claim 1 wherein said bulkheads separate each pontoon into a plurality of watertight compartments.

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