July 12, 1960 J. J. PEARSE 2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

Filed June 17, 1957 5 Sheets-Sheet 1

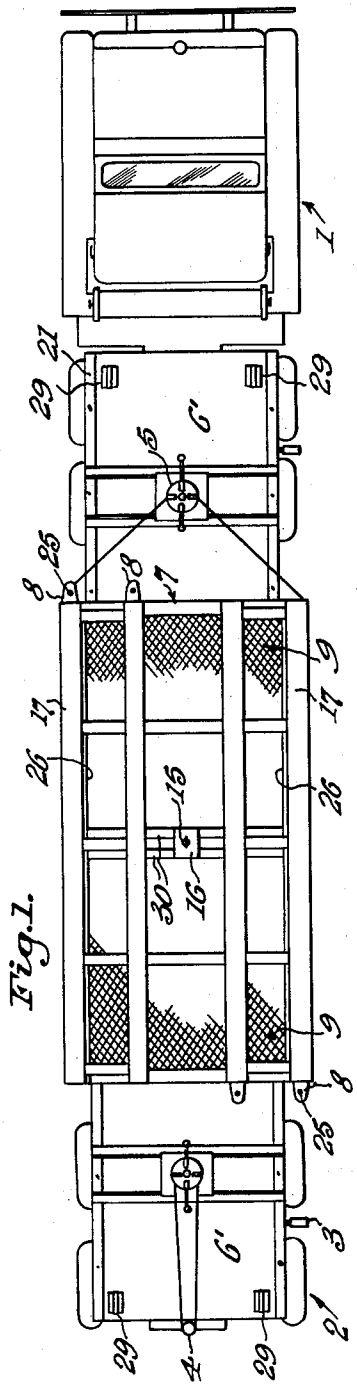


Fig. 1.

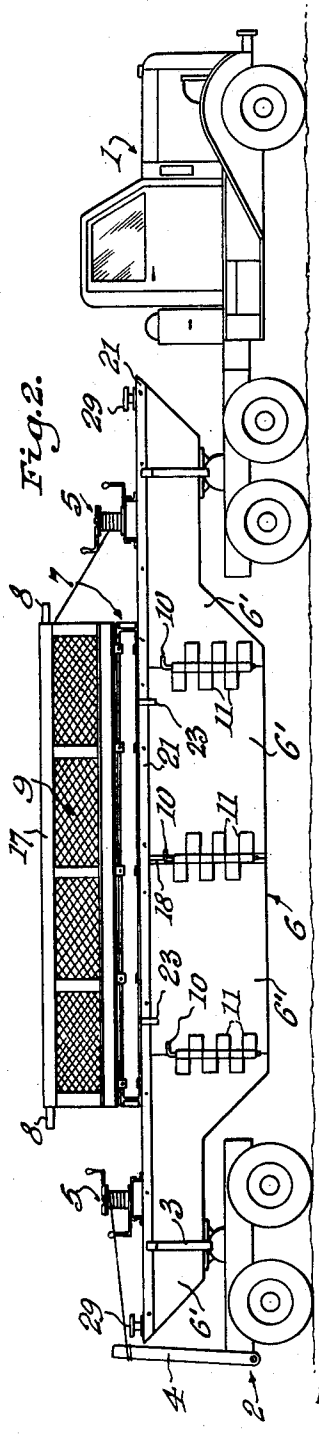


Fig. 2.

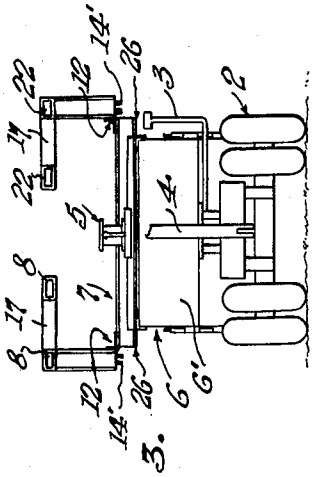


Fig. 3.

INVENTOR.
John J. Pearse
BY Willard J. Hodges Jr.
Benjamin Hamilton
ATTORNEYS

July 12, 1960 J. J. PEARSE 2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

Filed June 17, 1957 5 Sheets-Sheet 2

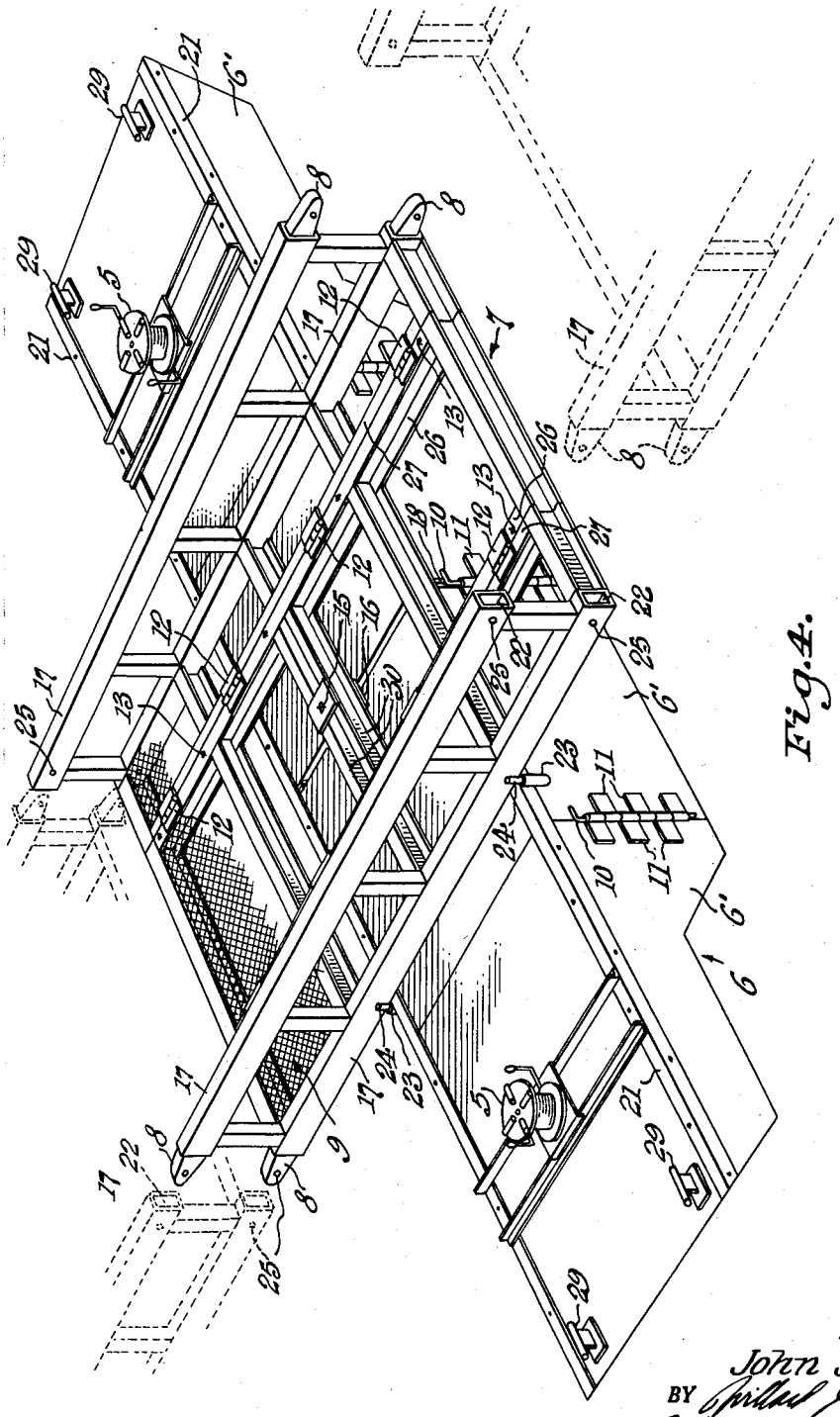


Fig. 4.

INVENTOR.
John J. Pearse
BY Willard J. Walker Jr.
Rumford Hamilton
ATTORNEYS

July 12, 1960 J. J. PEARSE 2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

Filed June 17, 1957 5 Sheets-Sheet 3

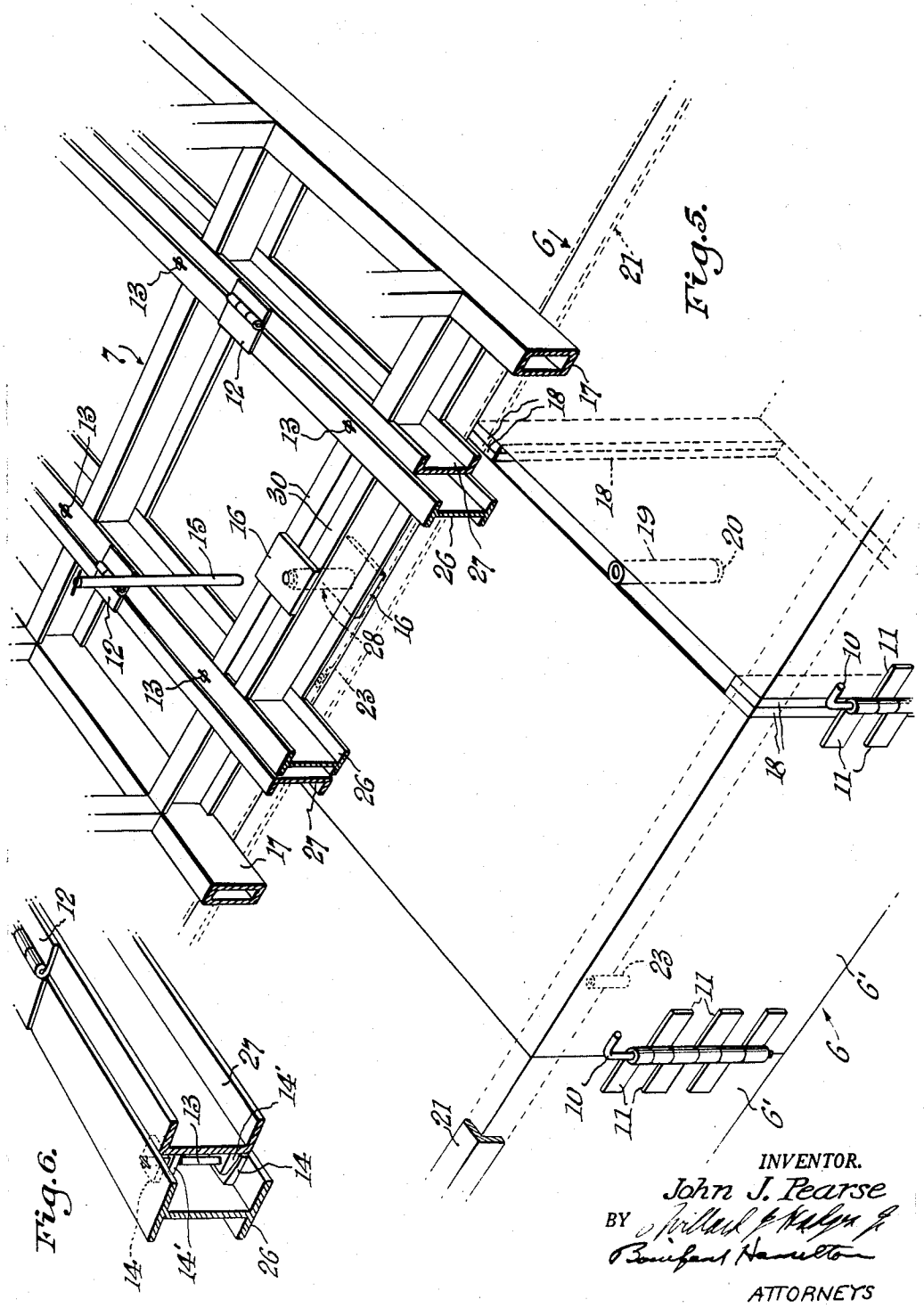


Fig. 5.

Fig. 6.

INVENTOR.
John J. Pearse
BY Pollard & Mullyn &
Beaufort Hamilton
ATTORNEYS

July 12, 1960 J. J. PEARSE 2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

Filed June 17, 1957 5 Sheets-Sheet 4

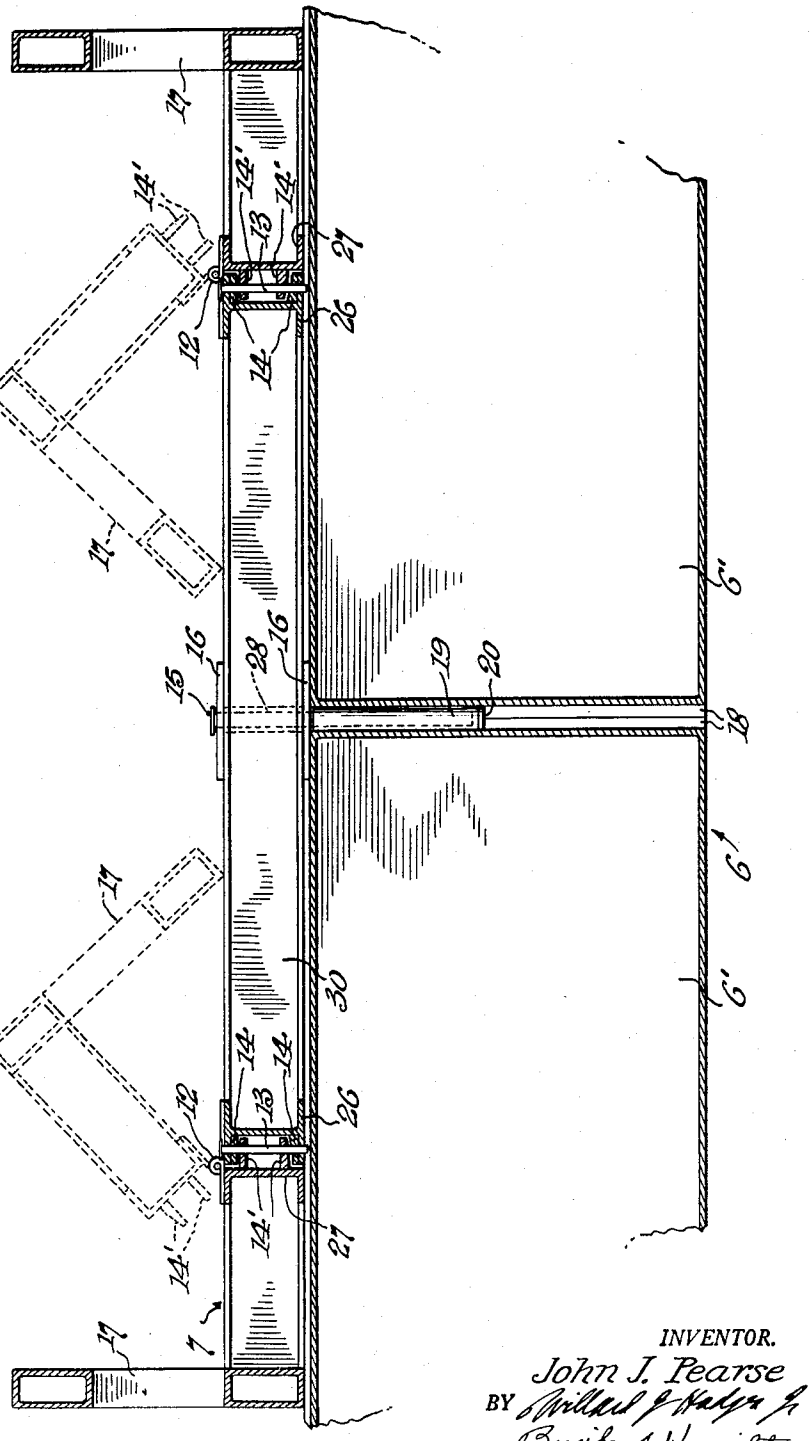


Fig. 7.

INVENTOR.
John J. Pearse
BY Willard J. Halyx Jr
Bouligny Hamilton
ATTORNEYS

July 12, 1960 J. J. PEARSE 2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

Filed June 17, 1957 5 Sheets-Sheet 5

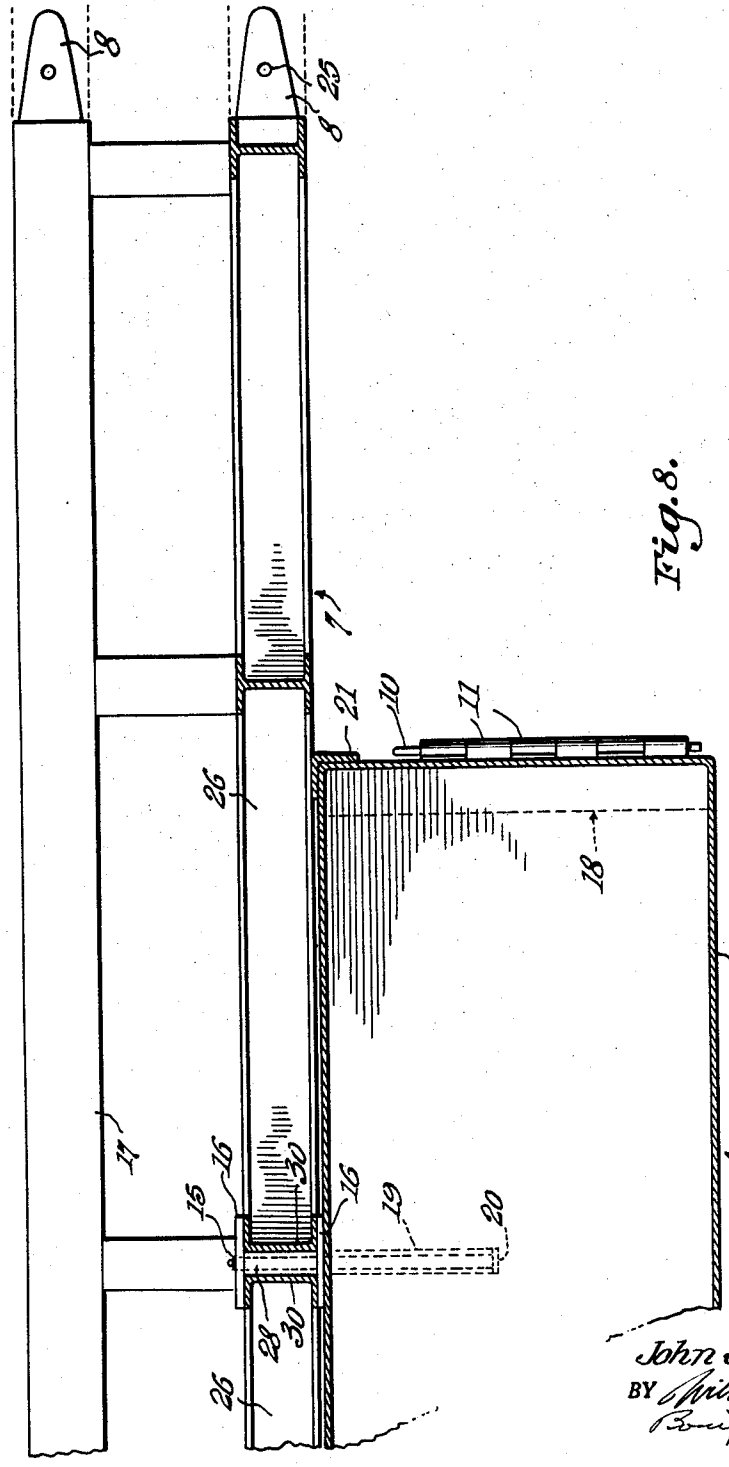


Fig. 8.

INVENTOR.
John J. Pearse
BY Willard J. Hadyn Jr.
Bonifant Hamilton

ATTORNEYS

United States Patent Office 2,944,270 Patented July 12, 1960

2,944,270

REVOLVING AND FOLDING MOBILE FLOATING BRIDGE

John J. Pearse, U.S. Army

Filed June 17, 1957, Ser. No. 666,257

2 Claims. (Cl. 14—27)

(Granted under Title 35, U.S. Code (1952), sec. 266)

The invention described herein may be manufactured and used by or for the Government for governmental purposes without the payment of any royalty thereon.

This invention relates to a floating, mobile bridge, particularly useful for military purposes.

Military operations in time of war require rapid transportability of troops and materiel over rivers and streams. Many times the permanent bridges are destroyed or damaged beyond use and it becomes imperative to throw up a temporary bridge to effect a crossing. Today's armies travel in the main on wheels in all sorts of heavy vehicles. Therefore, the temporary bridge must be able to hold comparatively heavy loads. At the same time because of enemy action and time factors, such a bridge must be erected as expeditiously as possible to minimize the risk to personnel building it. Additionally, such a bridge must be capable of being transported to the river crossing as rapidly as possible.

After use at any particular site, many times the bridge must be knocked down and ready for use at another place as the need arises.

At the present time, pontoon bridges of one sort or another are often used to provide the type of temporary bridge described. The most common of these employs a series of pontoons which are maneuvered into the water to ride into the current. They are then connected to each other by means of cables, generally at the upstream end, and over them is placed a bridge deck. The bridge deck is hauled independently of the pontoons and must be assembled piecemeal across the stream from the near bank. Where attempts have been made to provide an integral unit bridge section to obviate the difficulty of assembly at the site, a great decrease in lateral stability has resulted.

The present invention is intended to overcome the problem of slow assembly at the site by providing an integrated unit of pontoon and bridge deck which needs only a minimum of handling at the site to assemble and disassemble. Further, the invention is designed so as to give an excellent load performance when in use as a bridge without sacrificing transportability.

The principal object of this invention is to provide a pontoon bridge that is its own trailer for easy highway travel or travel over other suitable terrain using the conventional tractor truck, for example, for motive power, and which can be quickly launched and connected to similar units by a minimum crew to bridge bodies of water upon which supplies and personnel can be transported.

A further object of this invention is to provide a bridge-trailer arrangement of the type which in the trailer phase will occupy a minimum amount of road space and yet provide a stable lateral floating structure for the bridge phase.

The invention contemplates the bridge as a whole including the automotive unit, also the trailer units per se, which have individual utilities as well as a cooperative function as part of the bridge.

Another object of the invention is to provide a vehicular pontoon having an overall width that does not exceed the width of one traffic lane of a highway, and having a rotatable deck which can be secured lengthwise upon such pontoon when in transport so as not to extend beyond the width of the pontoon.

A further objects of the invention is to provide a bridge deck for a mobile bridge whose sides fold inwardly upon itself to restrict the transportable width to that of its pontoon.

A still further object of this invention is to provide a bridge of the class herein described comprising a middle section and two like end sections whereby the bridge may be launched and retrieved from either end.

A further object of the invention is to provide a bridge of the class herein described whose means of land transport is entirely removable when the structure is in use as a bridge whereby such means are released for movement of other like units.

It is a further object of this invention to provide a bridge of the class herein described comprising a multiplicity of interchangeable parts which may be transported individually or collectively and assembled rapidly and easily at any desired location.

The foregoing and other objects of this invention will be more apparent from reading the specification in conjunction with the drawings, forming a part thereof, wherein:

Fig. 1 is a top plan view of the bridge in a partly folded condition upon the transporting prime mover and dolly;

Fig. 2 is a side elevation of the overall structure;

Fig. 3 is a rear end elevation of the bridge in a partly folded condition atop the dolly and prime mover;

Fig. 4 is a perspective view showing the dismounted bridge with the deck in position for use;

Fig. 5 is an exploded perspective view showing the center portion of the bridge frame and center pontoon cubes;

Fig. 6 is a detailed perspective view showing a deck stiffener pin in position through the lugs to hold the deck rigid for use;

Fig. 7 is a central vertical section through the bridge, the parts being in position as in Fig. 4 in full lines and showing the folded position in dotted lines; and

Fig. 8 is a fragmentary detailed section of the parts as shown in Fig. 4.

In the drawings wherein like members are given the same reference numeral, the invention comprises, generally, a floating mobile bridge comprising a pontoon **6** (made up of connected water-tight cubes **6'**) and a bridge deck **7** pivotally mounted to said pontoon. The pontoon is detachably mounted on a mobile vehicle. The mobile vehicle may be any powered tractor trailer but preferably it is a prime mover **1** to which the pontoon **6** is attached as a trailer and secured to a rear dolly trailer **2** by means well known in the art, said dolly having a dolly pole **4** and a release lever **3**, so that the dolly may be released from the pontoon and pulled out from under it. The pontoon has capstans **5** atop it which are used to turn the pivotable bridge deck **7** from transporting position to load bearing position and return. The end cubes **6'** are shaped so as to provide easy transportability and also to give the overall pontoon a boat-like configuration for easy riding in water. The cubes **6'** are water-tight compartments connected together by lock pins **10** which fit through locking elements **11** welded to each cube alternately, the lock pins **10** cooperating with the locking elements **11** in the same manner that the hinge pin and the separate leaves of a double leaf hinge cooperate to maintain the leaves of the

hinge in assembled condition. The overall pontoon 6 is further integrated by angle irons 21 which are bolted or welded to the cubes 6'. If it is desired to retain the bridge in a condition for rapid disassembling, the angle irons 21 should be bolted to the pontoon whereby the individual cubes 6' making up the overall pontoon 6 can be rapidly and easily replaced.

The two center cubes are separated by vertical space bars 18 welded to either side of each cube. This is best shown in Fig. 5. The spacing is accomplished so that the center pivot pin 15 may be fitted into washers 16 and pivot pin insert 28. Said insert is welded between the center cross channel beams 30. Pin 15 further extends downward into pivot pin holder 19, which has a stop 20 at its downwardly extremity. The holder 19 is disposed in the space between the center cubes 6' with the upper end thereof flush with the tops of the cubes and the holder is welded to one of the facing walls of the center cubes 6', as shown in Fig. 5. In the assembled condition of the bridge and pontoon the pin insert 28 is aligned with the pin holder 19 so that the pivot pin 15 projects through pin insert 28 into pin holder 19. In this manner the bridge deck 7 fits on the pontoon 6 and can be disassembled therefrom by removing pivot pin 15. It can be rotated by the use of capstans 5 from the longitudinal traveling position to the transverse or bridge position. While in the transverse or bridge position, the deck 7 is held in place by lock pins and pin holders, 24 and 23 respectively, at the four intersections of the outer edges of the pontoon and the bridge deck. The bridge deck 7 comprises two pairs of complementary I-beams 26 and channel beams 27 intermediate of the longitudinal axis. These are bisected by I-beams, except for the center portion which has two channel beams 30, already mentioned, and as best shown in Figs. 5 and 8. The bridge deck 7 terminates with rails 17, said rails having male inserts 8 and female counterparts 22 at opposite ends. These rails are preferably arranged as shown in Fig. 7 with male and female connectors as aforesaid at each end. The bridge deck is covered by a bridge mat 9. I-beam 26 and its complementary channel beam 27 are hinged together with a series of hinges 12, which hinges allow part of the bridge deck 7 and the rail 17 to fold back upon the remainder of the bridge deck 7 as shown in Fig. 7 in dotted lines. I-beams 26 contain a plurality of holes for deck stiffener pins 13 which pins fit in order through the I-beam 26, a lug 14 welded to the I-beam, a lug 14' welded to the channel beam, a second lug 14' welded to the channel beam and a final lug 14 welded to the I-beam at the bottom of the I-beam. The lower two lugs 14 and 14' are angled so as to provide room for the hinge action. Fig. 6 shows this deck stiffener assembly in perspective, while Fig. 7 shows this structure in the open and closed position.

It is believed that the bridge deck 7, pontoon 6, and prime mover 1 relationship and cooperation may be more fully understood in studying the complete cycle of operation, starting with the bridge deck longitudinally mounted upon the pontoon 6 or transport position and folded upon itself. When in this position the folded portions of bridge deck 7 are preferably lashed together (not shown). Starting with the folded position, as stated, the bridge is easily transported and borne along average roads to the water. At this point the pontoon 6 may be backed into the water and floated free from its transportation. This is accomplished by use of release lever 3 on dolly 2 whereupon the dolly may be pulled back to shore with use of lever 4. In regard to the dolly release, it need only be stated that it is of standard and well known construction and it appears appropriate that it be shown diagrammatically as presently disclosed rather than to devote effort to disclosing what would appear to be extraneous detail. The bridge deck 7 may then be unlashed, unfolded and rotated to the transverse position by a

minimum of two men using capstans 5 attached to the pontoon. The deck stiffener pins 13 are now inserted through the I-beam 26, and the lugs 14 and 14' to maintain deck rigidity. Pins 24 are placed in holders 23 to hold the deck 7 in transverse position. The sections are now ready for connection to other sections to form the bridge. This is accomplished by the sections coming together with the male inserts 8 fitting into their female counterparts 22 and a pin locking them together at 25. The sections may be anchored in the conventional manner by use of pontoon anchor wire connected to shore-connected suspended cables (not shown). Mooring hooks 29 can be used for this purpose. The floats may be anchored in this manner to both upstream and downstream suspended cables. As regards the use of capstans 5, a tie rope or cable end is snubbed around the drum of the capstan and is payed into the drum by use of a horizontally extending handle with an upright section for gripping by the hand. A brake lock, which may be of the pawl and ratchet type, is used to lock the capstan when the desired length of tie has been attained.

When the use for the bridge is ended at any particular site, the sections can be unhooked and hauled to shore where they can be connected (at either end) to a dolly and a prime mover, the bridge deck rotated to the longitudinal position, folded, lashed and hauled speedily to the next site.

Having thus described my invention, what I claim as new and wish to secure by Letters Patent is:

1. A floating mobile bridge assembly adapted for connection to a tractor truck at one end and adapted to be supported at the other end by a removable rear dolly, said bridge assembly comprising a plurality of shaped water-tight compartments, each compartment detachably connected to an adjacent compartment to form an elongated integral unit, a bridge deck centrally rotatably mounted upon said assembly by a pin journaled in a pin insert vertically disposed and secured centrally to said bridge deck, a socket closed at the lower end thereof and vertically disposed between the centermost compartments and secured to one of said compartments, said pin insert and socket aligned to receive said pin when said bridge deck is mounted on said assembly, a foldable deck portion disposed along each side of said bridge deck parallel to the longitudinal axis thereof, a pair of complementary members extending along each longitudinal side of said bridge deck, each pair of said complementary members comprising an I-beam secured to said bridge deck and a channel beam secured to an adjacent one of said foldable deck portions, a plurality of hinges connecting the I-beam and the channel beam of each pair of said complementary members to permit folding each said foldable deck portion onto said bridge deck, a plurality of drilled lugs attached to the web of the channel beam of each said pair of complementary members on a side opposite the flanges thereof and juxtaposed over each other and a plurality of pins fitting through the I-beam flanges and the juxtaposed lugs locking each of said foldable deck portions in the open position, capstans mounted at either end of said assembly to rotate said bridge deck, and railings extending from the outboard edge of each of said foldable deck portions, said railings having alternate male and female connections at their ends for joining to similar floating bridges.

2. A bridge construction comprising a main bridge deck and a foldable deck portion hingedly secured to each one of a pair of opposite sides of said main bridge deck, a pair of complementary members extending along each one of said pair of opposite sides of said bridge deck, each pair of said complementary members comprising an I-beam secured to an outboard edge of one of said pair of opposite sides of said main bridge deck and a channel beam secured to an inboard edge of each one of said foldable deck portions with the flanges thereof

facing the outboard direction, a plurality of hinges connecting the I-beam and the channel beam of each pair of said complementary members to permit folding each said foldable deck portion onto said main bridge deck, a plurality of drilled lugs attached to the web of the channel beam of each said pair of complementary members on a side opposite the flanges thereof and juxtaposed over each other and a plurality of pins fitting through the I-beam flanges and the juxtaposed lugs locking each of said foldable deck portions in the open position, and railings extending from the outboard edge of each of said foldable deck portions, said railings having alternate male and female connections at their ends for joining to similar bridges.

References Cited in the file of this patent

UNITED STATES PATENTS

1,640,980	Caroni	Aug. 30, 1927
2,321,677	Higgins	June 15, 1943
2,376,023	Bailey	May 15, 1945
2,687,225	Martin	Aug. 24, 1954
2,762,069	Laycock	Sept. 11, 1956

FOREIGN PATENTS

760,159	France	Dec. 6, 1933