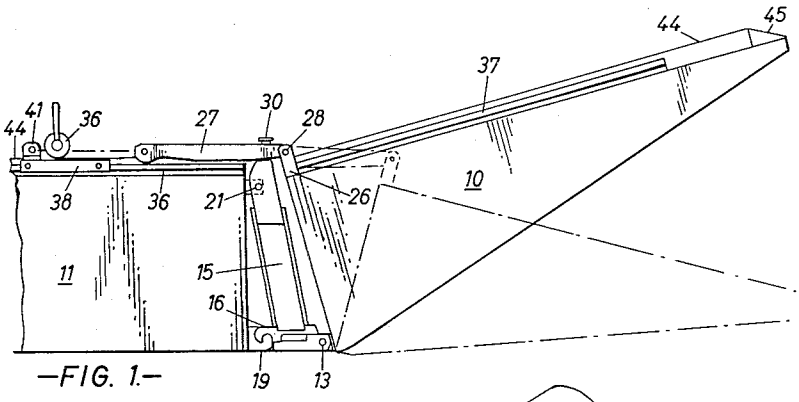
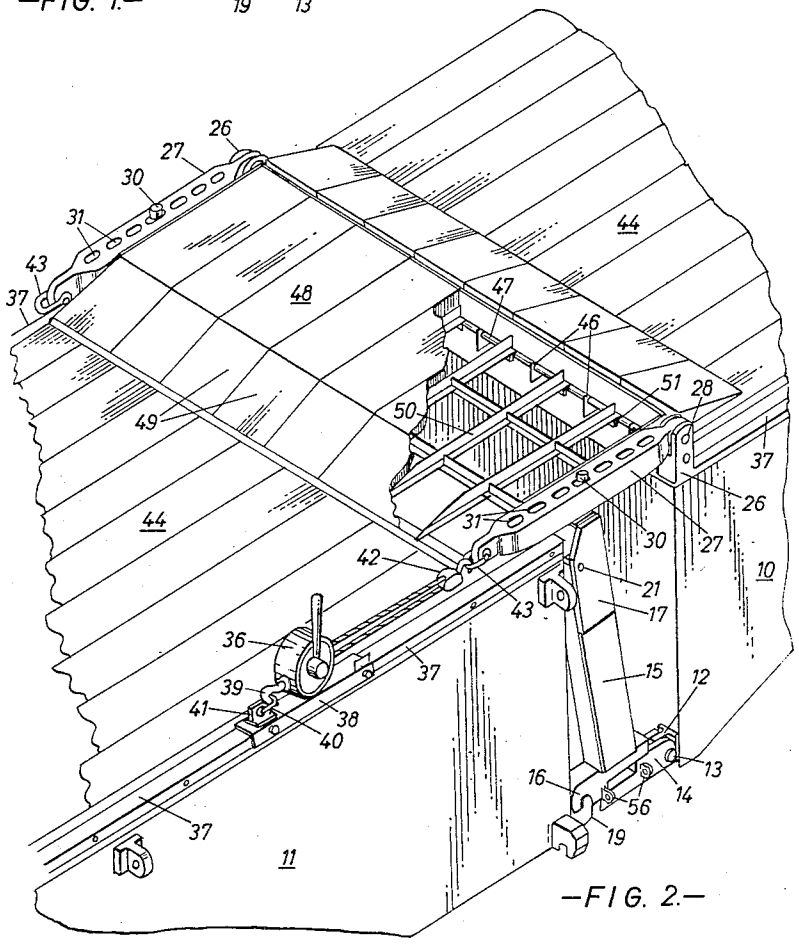
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—FIG. 1.—



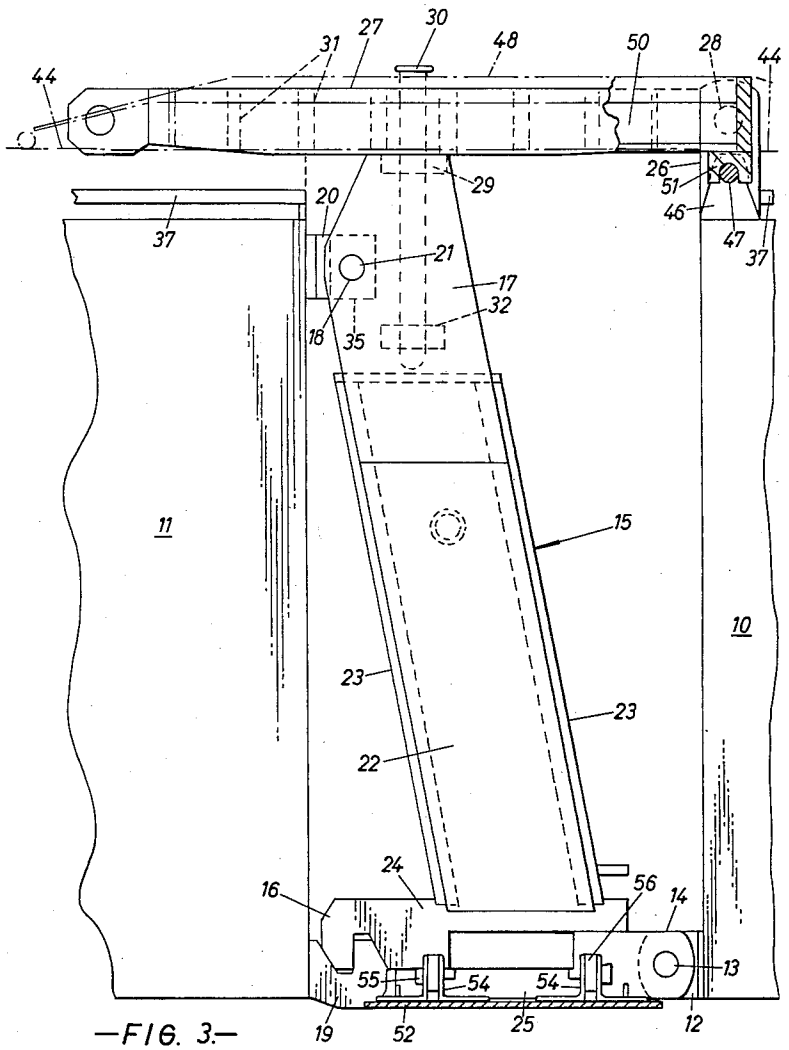
—FIG. 2.—

INVENTOR
Thomas Storey
BY
Bierman + Bierman
ATTORNEYS

July 25, 1961 T. STOREY 2,993,459

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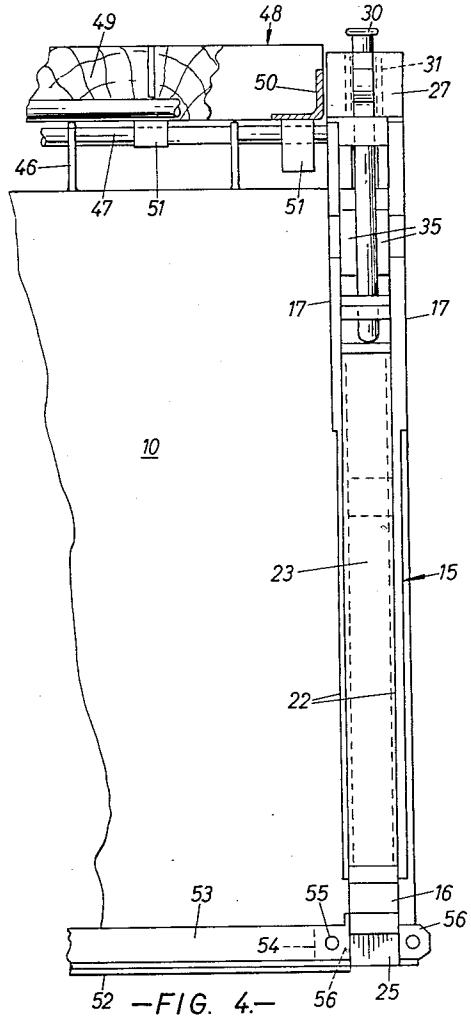
—FIG. 3.—

INVENTOR
Thomas Storey
BY
Bierman & Bierman
ATTORNEYS

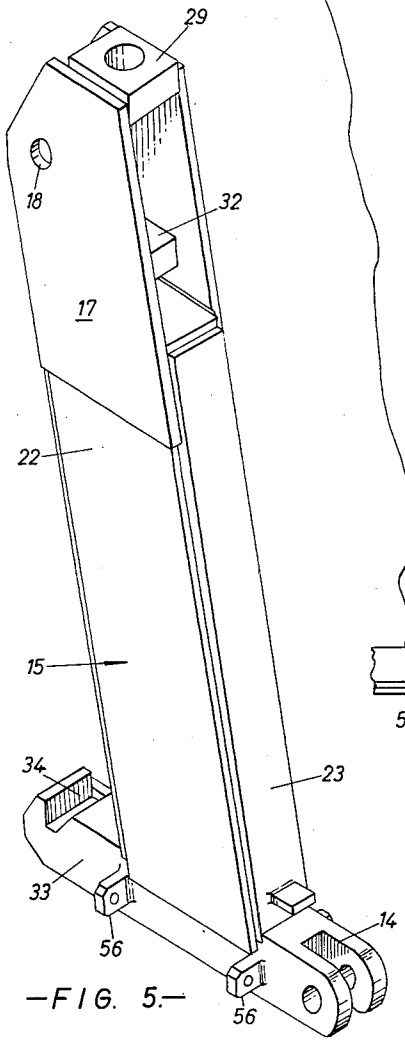
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—FIG. 4.—



—FIG. 5.—

INVENTOR
Thomas Storey
BY
Bierman + Bierman
ATTORNEY

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PONTOON ASSEMBLY

Thomas Storey, 30 Broadway, Bramhall, Cheshire, England

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11 Claims. (Cl. 114—5)

This invention relates to pontoons such as are used in the construction of rafts, and is an improvement in or modification of the invention forming the subject of my prior patent application Serial No. 648,644.

In the specification of such patent application we have described and claimed the use, in a pontoon assembly, of a plurality of inherently rigid sections, some at least of which comprise buoyant steel tanks, adapted for detachable rigid connection together by means of complementary projections on mutually opposed portions thereof, each such connection involving substantially horizontal interdigitation of apertured male and female lugs respectively at the upper parts of the juxtaposed sections, subsequent substantially vertical interengagement of male and femal hooks respectively at the lower parts of said sections, and finally the pinning together of the interengaged upper lugs in such manner as to prevent separation of said hooks.

The steel tanks aforesaid are of rectangular prismatic form, conveniently measuring 17 feet 4 inches long, 8 feet wide, and 4 feet deep, which provides a buoyancy or dead-weight capacity of 10 tons at 9 inches freeboard.

Each end of such a buoyant section is provided, adjacent its upper and lower corners respectively, with two lugs and two hooks, these projections being of male form at one end of the section and of female form at the other. Each side of the section is provided with two sets of similarly spaced upper lugs and lower hooks, these again being male at one side and female at the other.

Other sections, for use in connecting these steel tanks together, are non-buoyant but similarly provided with upper lugs and lower hooks, which, however, are of like (male or female) form at both ends of each section.

In my prior specification aforesaid I have proposed to utilize, in conjunction with the rectangular steel tanks, buoyant sections of similar construction but somewhat shorter than the others and having sloping bottoms to reduce the resistance offered to a flow of water longitudinally thereof, the intention being to employ such a bow section at one or each end of a barge or raft including one or more of the larger rectangular tanks.

Although any two of the latter can readily be connected end-to-end, side-by-side, or end-to-side whilst floating, by entering male lugs on one into female lugs on the other and then canting one section relatively to the other so that the male and female lugs at their lower parts override and engage one another prior to the pinning of the lugs together to lock the connection, the addition of a bow section is a less simple matter since its wedge shape in side view causes it normally to float with its deep end inclined to the vertical.

The present invention is based upon appreciation of the fact that this apparent drawback of a wedge-shaped buoyant section enables it to serve a purpose additional to that of augmenting the flotational capacity of a sectional barge or raft.

According to one aspect of this invention, I provide, for connection to the end of one of the rectangular sections aforesaid, a buoyant section wedge-shaped in side view which has hingedly mounted at each lower corner of its deep end an upstanding member whose inclination

to the latter is controlled by an adjustable tie-bar at the top thereof, each such member being provided with an upper apertured lug and a lower hook for connection to the complementary projections on the juxtaposed rectangular section.

It will be apreciated that a wedge-shaped section provided with the hinged connector members abovementioned can be floated freely up to the rectangular section with the said members presented substantially vertically for connection to the latter, after which the tie-bars can be temporarily released from such members and traction applied to the wedge-shaped section so as to raise its deck towards, or even beyond, the horizontal.

According to a further aspect of the present invention, a buoyant pontoon section wedge-shaped in side view, and having hingedly mounted at each lower corner of its deep end an adjustably inclined member with means for detachably connecting the same to the side or end of a rectangular buoyant section, is provided at the upper edge of such deep end with a hinged bridge structure adapted to rest upon the deck of said rectangular section after connection of the wedge-shaped section thereto as aforesaid, the wedge-shaped section under these conditions forming a floating ramp whose inclination relatively to the deck of the rectangular section can be varied to suit requirements.

In the accompanying drawings:

FIG. 1 is a diagrammatic side elevation showing part of a sectional barge or raft having a wedge-shaped end section connected thereto in accordance with the present invention and shown at opposite limits of its permissible angular travel,

FIG. 2 is a fragmentary perspective view of the same assembly showing the end section in an intermediate position and adapted for use as a floating ramp,

FIG. 3 is a side elevation showing the parts in the same position as in FIG. 2, but drawn to a larger scale and sectioned in a longitudinal central plane,

FIG. 4 is a fragmentary end elevation of the wedge-shaped section shown separated from the rest of the raft, and

FIG. 5 is a perspective view of a connector member alternative to that shown in the other figures.

In the example illustrated, a buoyant bow or ramp section **10** for application to a barge or raft assembled, as described in the specification of our prior patent aforesaid, wholly or partly from larger buoyant sections **11** of rectangular prismatic form, is constructed similarly to the last-mentioned sections from steel plates welded or otherwise secured to a framework of angle- and T-section members.

The bow or ramp section **10** conveniently measures 12 feet long by 8 feet wide on deck, and is wedge-shaped in side elevation, its maximum depth being 4 feet.

At each lower corner of its deep end is fixed an apertured lug **12** hingedly connected by a captive horizontal pin **13** to a similarly apertured clevis **14** at the foot of a connector member **15** which is thereby enabled to swing in a vertical plane.

At its outer end the foot of this connector member **15** is provided with a downwardly directed (female) hook **16** corresponding to those provided, as described in our prior specification, upon one side and one end of each of the larger sections **11**.

The upper end of each connector member **15** bears extension plates **17** welded to opposite sides thereof to form a clevis and aligned holes **18** are provided in these plates at such a distance from the female hook **16** that, after interengagement of the latter with a male hook **19** on the larger pontoon section **11**, an apertured male lug **20** near the upper edge of such section can be accom-

modated between the connector extension plates **17** and secured thereto by a horizontal locking pin **21**.

The body of the connector member **15** conveniently comprises side plates **22** welded to corresponding flanges of two opposed channels **23** as well as to the lower edges of the extension plates **17** and a part **24** of the foot which carries the hook **16**, the clevis **14** being formed in a second foot part **25** welded in overlapping relation with the part **24**.

Near the upper corners of its deep end the bow or ramp section **10** has upstanding clevises **26** fixed to its deck and a stout tie-bar **27** of rectangular cross-section is hingedly mounted in this clevis upon a pin **28** for movement in the same vertical plane as the adjacent connector member **15**, whose extension plates **17** are connected at the top by an apertured filler plate **29** which at all times supports the swinging tie-bar **27**.

The inclination of each connector member **15** to the end face of the bow or ramp section **10** is controlled by a captive pin **30** passed vertically through any one of a row of holes **31** in the tie-bar **27** to engage with the hole in the filler plate **29** and in a similar plate **32** fixed below the latter.

In connecting the bow or ramp section **10** to one of the component raft sections **11**, it is floated freely up to an end or side of the latter which bears male lugs **20** and male hooks **19**, the thin end of the wedge-shaped section **10** under these conditions being just awash (as indicated in broken lines in FIG. 1) and the outer end holes **31** of the tie-bars **27** being pinned to the tops of the connector member **15** so that the latter are inclined forwardly, with their horizontal pin-holes **18** directly above their female hooks **16**.

On correct presentation of the one section to the other, the connector hooks **16** will then ride over the submerged male hooks **19** of the larger pontoon section **11**, whose male lugs **20** will enter between the extension plates **17** of the two connector members **15**.

Traction is afterwards applied to the upper part of the bow or ramp section **10** so that its connector hooks **16** will interengage with the male hooks **19**, it being then possible to lock the upper ends of the connector members **15** to the male lugs **20** by means of the pins **21**.

In the event of its being desired to connect the bow or ramp section **10** to an end or side of a raft section **11** provided with female hooks and lugs, use is made of the modified connector member shown in FIG. 5. This differs from the member previously described in having a one-piece foot **33** provided with the clevis **14** and a male hook **34** at opposite ends thereof, besides which the extension plates **17** are without the thickening pieces **35** which, in the previous construction, are welded to their inner sides for snug engagement of the male lug **20** (FIGS. 3 and 4).

If necessary, the traction applied to the upper part of the section **10** is continued until the deck of the latter is substantially flush with that of the other section **11** (see FIG. 2) or even upwardly inclined as shown in full lines in FIG. 1. In a convenient arrangement, the connector member **15** and tie-bars **27** are designed to permit the thin end of the wedge-shaped section **10** to be raised or lowered some 2½ to 3 feet with reference to the deck-level plane of the raft.

Any suitable means may be provided for applying the necessary traction when lifting the bow or ramp section **10** as aforesaid, but it is preferred to connect the free ends of the two tie-bars **27** to chain-type lever-operated pull-jacks **36** suitably anchored upon the raft.

For example, when the bow or ramp section **10** is connected to the end of the main section **11** and the sections are provided with raised gunwales **37** having pin-holes therethrough, a channel saddle **38** may be fixed to each such gunwale at a convenient position and a hook **39** on one of the pull-jacks **36** engaged with a shackle **40** on an upstanding lug **41** on such saddle, the running block **42** of such jack being similarly connected to a shackle **43** at the free end of the adjacent tie-bar **27**.

To facilitate the transference of vehicles or other loads from the hinged bow or ramp section **10** to the main body of the raft, the deck of each section is provided with a timber grillage **44** which is laterally positioned by the raised gunwales **37** and located endwise by cut-outs (not shown) therein receiving various incidental projections from such deck.

In the case of the bow or ramp section **10**, additional endwise location is obtained by engaging the outboard edge of the grillage **44** under a channel nosing **45** at the thin end of the section, its inboard edge abutting a series of upstanding lugs **46** which support a transverse rod **47** connecting the tie-bar clevises **26**. The bar above rod **47** (FIG. 4) is welded along the front edge of frame **50** to provide a nosing for bridge **48**.

Such rod provides a fulcrum for a hinged bridge **48** consisting of timbers **49** fixed to a metal frame **50** which has suitable half-bearings **51** at one end.

This bridge structure **48** is supported in a raised position during the connection of the buoyant sections **10**, **11** together and is then lowered to rest upon the deck grillage **44** of the main section **11**, sliding to and fro upon such grillage as the bow or ramp section **10** is raised or lowered to adjust its free end to the height required by circumstances.

It will be appreciated that the present invention enables a sectional raft of the kind described in my prior specification to be loaded or unloaded whilst floating without the need for any quay or the like, the hinged ramp section **10** being left floating until it grounds upon a shelving shore and alternatively raised to co-operate with any bank which may be available.

Preferably the pin-holes **31** provided in each tie-bar **27** are elongated in a direction longitudinally of the latter to allow for its variable angular inclination relative to the associated connector member **15**, and also to afford a measure of flexibility in the attachment of the bow or ramp section **10** to the adjacent raft section **11**.

By forming each pin-hole **31** as a slot 3⅛ inches long for co-operation with a 1⅞ inch diameter locking pin **30**, it is possible, with the latter in position, to raise or lower the free end of the bow or ramp section **10** through some 6 inches simply by tightening or relaxing the traction means aforesaid.

This allows the raft, when loaded, to take a further 6 inches draught before the floating ramp section **10** tends to rise in relation thereto and thus to stress the tie-bars **27** in compression. Similarly, if the loading of the raft calls for less than **6** inches of draught, the ramp **10** can be lifted clear of its grounding point, merely by operating the pull-jacks **36** or their equivalent to take up the play in the tie-bar pin-holes **31**.

Preferably a baffle plate **52** is employed to cover the gap between the lower edges of the juxtaposed sections **10**, **11** and thereby reduce the water resistance offered to the assembly during propulsion or towage. In the convenient arrangement shown in FIGS. 3 and 4, this plate **52** is reinforced by two longitudinal angles **53** cooperating with brackets **54** to provide anchorages for pins **55** which are passed through spaced lugs **56** on the feet of the connector members **15**.

I claim:

1. A wedge-shaped pontoon section for connection to the end of a rectangular buoyant section of a barge or raft comprising a buoyant tank having a deep end, upstanding connector members hingedly mounted at its lower end to said deep end of said tank, a pontoon section adjacent to said deep end, a hook at said lower end adapted to be engaged with a complementary member of said pontoon section, apertured tie-bars pivoted to said tank above said connector, means passing vertically

through said tie-bars for connecting to said connectors in one of a plurality of inclined positions, and means for securing said tie bars to the upper part of said last named pontoon section.

2. The structure according to claim 1, further characterised in that the upper part of each upstanding connector member is represented by two laterally spaced plates adapted to accommodate between them, and to be pinned to, an apertured lug on said last named section.

3. The structure according to claim 1, further characterised in that each lower corner of said deep end carries an apertured lug to which is pinned a clevis at one end of a foot portion of the adjacent upstanding connector member, the other end of such foot portion being formed with the hook aforesaid.

4. The structure according to claim 1 further characterised in that each upper corner of said deep end carries an upright clevis in which is pivoted one end of the adjacent tie-bar, the latter having a longitudinal row of holes through any of which a pin can be inserted into the top of the upstanding connector member.

5. The structure according to claim 2, further characterised in that the laterally spaced plates at the top of each connector member are united to apertured filler plates through which the tire-bar pin is passed.

6. The structure according to claim 4, further characterised in that the pin-holes in each tie-bar are slotted longitudinally of the latter for the purpose described.

7. The structure according to claim 1, further characterised by a baffle plate attached to the lower ends of the upstanding connector members so as to cover the gap between the lower edges of the two sections after their connection as aforesaid.

8. In combination, a pontoon section according to

claim 1 and traction means anchorable to the last named pontoon section for upwardly tilting the wedge-shaped section after it has been floated up to the latter and connected thereto as aforesaid.

9. The combination according to claim 8, further characterised in that the traction means aforesaid comprise a pair of manually-operable pull-jacks adapted for connection between detachable anchorages on the last named pontoon section and the free ends of the adjustable tie-bars.

10. A buoyant pontoon section wedge-shaped in side view and having hingedly mounted at each lower corner of its deep end an adjustably inclined member with means for detachably connecting the same to the side or end of a barge or raft assembled from rectangular sections, the deep end of the said wedge-shaped section being provided at its upper edge with a hinged bridge structure adapted to rest upon the deck of the adjacent rectangular section after connection to the latter of the wedge-shaped section which thereafter forms a floating ramp with a variable inclination to the deck of said rectangular section.

11. The structure according to claim 10, further characterised in that the bridge structure has a metal frame with half-bearings adapted to seat upon a hinge bar fixed transversely of the wedge shaped section.

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