

TWO MAN LOADING PLATFORM FOR USE ON SUBMARINES

STATEMENT OF GOVERNMENT INTEREST

The invention described herein may be manufactured and used by or for the Government of the United States of America for governmental purposes without the payment of any royalties thereon or therefor.

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The present invention relates to marine docks and piers and more particularly to portable or demountable marine docks and piers.

(2) Brief Description of the Prior Art

The prior art discloses various portable or demountable marine piers.

U.S. Patent No. 2,687,617 to Newell, for example, discloses a pier structure comprising side rails and legs. The legs are connected to their respective deck frames. The respective pier sections are detachably connected to the next preceding pier section by means of detachable couplings.

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1 Attorney Docket No. 78612

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16 (2) Brief Description of the Prior Art

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18 marine piers.

19 U.S. Patent No. 2,687,617 to Newell, for example, discloses
20 a pier structure comprising side rails and legs. The legs are
21 connected to their respective deck frames. The respective pier
22 sections are detachably connected to the next preceding pier
23 section by means of detachable couplings.

1 U.S. Patent No. 3,081,601 to Fentiman discloses a
2 demountable dock for small water craft comprising an elongated
3 frame which includes knockdown girders that are rigidly braced
4 in spaced parallel relation by crossed arms.

5 U.S. Patent No. 3,046,748 to Monroe discloses a pier in
6 which axially spaced, link connected brackets are secured to
7 cross-bars to enable the pier to be foldable.

8 U.S. Patent No. 3,841,104 to Hufford discloses a dock
9 structure that is easily assembled or dismantled for winter
10 storage including foldable support posts that are readily
11 removable from a gangplank. When disassembled the gangplank is
12 adapted for on shore storage. The shore end of the gangplank is
13 removably connectable to an on shore support. At its opposite
14 end the gangplank is removably connected to and supported by
15 posts, which are secured at their lower ends to the bottom
16 formation of a body of water. Submerged, pivotal coupling
17 between the upper and lower ends of the post allow the upper
18 post portions to rotate relative to the lower portions in
19 relative rectilinear relationship for supporting the offshore
20 end of the gangplank when the dock is assembled.

21 U.S. Patent No. 3,999,397 to Albery discloses a modular
22 dock system comprising one or more dock panels adapted to be
23 interconnected into a pier. Each of said panels comprises a

1 plurality of elongated extruded aluminum panel members having a
2 flat upper wall, a pair of side walls having flanges along the
3 lower edges and a central rib structure having lower flanges
4 parallel of the flanges on the side wall. A pair of aluminum
5 cross-members at opposite ends of the panel members have a
6 channel shaped cross-section and a web secured to the flanges of
7 said panel members and a pair of downwardly extending side
8 flanges.

9 U.S. Patent No. 4,398,849 to Moran et al. discloses a
10 portable dock and dock sections having a plurality of frame
11 members forming a rectangular deck frame for supporting a deck
12 assembly, a pair of adjustable legs extending from adjacent one
13 end of the rectangular deck frame and a first coupling unit
14 disposed on a frame member at the other end of the deck frame.

15 U.S. Patent No. 4,604,001 to Wetmore discloses a jackdown
16 tension leg platform which may be used for processing a
17 commodity liberated from the ocean floor by one or more wells.
18 The platform includes a closed buoyant hull which houses
19 production equipment and at least one connector disposed on the
20 one end secured to the ocean floor which is moved upwardly
21 relative to the hull to submerge the hull to a depth below the
22 majority of the ocean's hydrostatic forces and, at the same
23 time, tension the connector to hold and stabilize the hull over

1 the wells. Conduits are connected between the wells and the
2 submerged hull and between the hull and the surface.

3 Ballistic missile submarines are conventionally
4 characterized by a Vertical Launch System (VLS) having a
5 plurality of missile tubes. Such a system is usually serviced
6 by a large structure that partially surrounds the submarine at
7 its bow and on both lateral sides. Such a large steel structure
8 conventionally requires a dockside crane and several men for a
9 day to assemble.

10 In the case where only one or two tubes need a platform, or
11 if a crane is not available, there is a need for a lightweight
12 platform that could be carried and assembled by two men and
13 stored on the submarine to allow for faster and better
14 serviceability for the VLS.

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SUMMARY OF THE INVENTION

17 It is an object of the present invention to provide a two
18 man loading platform for VLS equipped submarines and other
19 similar vessels.

20 The present invention comprises a platform for placement of
21 vertically positioned missiles in a ballistic missile submarine,
22 such as a SSN 688 class submarine equipped with VLS missile
23 tubes. The platform includes a vertically inclined rail and a

1 horizontal frame. In the frame there is a first element having
2 a first and a second end superimposed over the inclined rail.
3 This first element is movably mounted directly on the rail at
4 the first end and movably mounted in vertically spaced relation
5 above said inclined rail at said second end. At least one
6 second element is spaced laterally from the first element to
7 enclose a missile tube access opening. A vertical support means
8 is also positioned in opposed relation to the inclined rail.

9 The invention also encompasses a submersible vessel
10 comprising a hull having an upper surface having a longitudinal
11 centerline and opposed lateral convex surfaces. A longitudinal
12 rail is superimposed on the upper surface of the hull
13 approximately over at least part of its centerline. A
14 horizontal frame comprising a first element is superimposed over
15 the rail and a second element extends laterally from the first
16 element. A frame support means is vertically interposed between
17 one of the convex lateral surfaces and the second element of the
18 horizontal frame.

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BRIEF DESCRIPTION OF THE DRAWINGS

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Other objects, features and advantages of the present
invention will become apparent upon reference to the following
description of the preferred embodiments and to the drawing,

1 wherein corresponding reference characters indicate
2 corresponding parts in the drawing and wherein:

3 FIG. 1 is a perspective view of a preferred embodiment of
4 the platform of the present invention shown as mounted on a
5 submarine; and

6 FIG. 2 is a more detailed inner front perspective view of
7 the platform shown in FIG. 1.

8

9 DESCRIPTION OF THE PREFERRED EMBODIMENT

10 Referring to FIG. 1, the submarine hull 10 (shown as
11 fragment) has an upper side 12 and opposed concave lateral sides
12 14 and 16. The upper side 12 slopes downwardly in the direction
13 of the bow 18 and also slopes downwardly in the direction of the
14 stern 20. The upper side 12 has a centerline 22 that coincides
15 with a center plane of the entire vessel. This submarine may
16 preferably be a 688 Class submarine, usually referred to as SSN
17 688 Class submarine, equipped with VLS missile tubes, or other
18 similar vessel. Referring now also to FIG. 2, there is shown
19 mounted on the centerline 22 of the upper side of the submarine
20 hull 10 an inclined rail 26. The frame 28 is mounted on rail
21 26. The frame includes the first element 30, which is
22 superimposed directly over the rail 26. The frame also includes
23 the second element 32 that is in spaced parallel relation to the

1 first element 30. Spaced transverse third element 34 and fourth
2 element 36 connect the first element 30 and second element 32 in
3 perpendicular relation. The second element 32 includes an inner
4 beam 40 and an outer beam 42. The third element 34 includes an
5 inner beam 44 and an outer beam 46. The fourth element 36
6 includes an inner beam 48 and an outer beam 50. Between the
7 first element 30 and the inner beams 40, 44, and 48 there is
8 defined a missile tube access space 52. At the intersection of
9 the inner beam 40 and the inner beam 44 there is a first outer
10 vertical support 54. At the intersection of the inner beam 40
11 and the inner beam 48 there is a second outer vertical support
12 56. Along the outer element 46 there is a third vertical
13 support 58. Along the outer element 50 there is a fourth outer
14 vertical support 60. The first vertical support 54 is attached
15 to beam 44 by means of a flange 62, which allows vertical
16 movement of the beam 44 along the vertical support 54.
17 Similarly, the fourth vertical support 60 is attached to beam 50
18 by means of a flange 64. The third vertical support 58 is
19 similarly fixed to beam 46 by another flange (not shown), and
20 second vertical support 56 is attached to beam 48 by another
21 flange (not shown). Flange 62 is interposed between an upper
22 lock 66 and a lower lock 68. Vertical support 58 has a similar
23 upper lock 70 and a lower lock 72, and lower lock 72 is

1 connected to lower lock 68 by a lower transverse frame 74.
2 Above flange 64 there is an upper lock 76 and below flange 64
3 there is a lower lock 78. Vertical support 56 has an upper lock
4 80 and a lower lock 82 that is connected to the lower lock 78 by
5 a lower transverse frame 84. Each of the vertical supports 54,
6 56, 58 and 60 has a foot, respectively 86, 88, 90 (FIG. 1) and
7 92. Interposed between the inner beams and the outer beams of
8 the second element 32, third element 34 and the fourth element
9 36, there is a grate 94 (FIG. 1). On the first element 30 there
10 is a forward inner vertical support 96 that passes through a
11 support receiving structure 98 and which has a rail engagement
12 foot 100. On its aft end, the first element 30 also has an aft
13 rail engagement foot 102.

14 The vertical position of the platform frame 28 is
15 adjustable on the vertical supports 54, 56, 58, 60 and 96, and
16 the frame would preferably be leveled prior to use. The frame
17 28 could also be locked on rail 26 at its feet 100 and 102.
18 These locks could be disengaged to allow the frame to be moved
19 fore and aft on the rail in the directions of the arrows 104
20 shown in FIG. 1.

21 The platform is capable of being of being carried and
22 assembled by two men on the deck of a 688 Class submarine or
23 similar vessel. The new platform eliminates the need to

1 assemble the complete loading platform requiring a dockside
2 crane and several workers. The lightweight platform would be
3 used on a single missile tube at one time, but be capable of
4 servicing any one of the twelve tubes.

5 The new platform is preferably constructed from lightweight
6 aluminum and breaks down into component parts that can be
7 carried and assembled by two men without the use of a dockside
8 crane. The rail is designed to conform to the curvature of the
9 submarine hull and to use existing fittings on the deck as
10 attachment points. If a crane were available, the assembled
11 platform could be moved from tube to tube if numerous tubes were
12 to be serviced and the full sized platform was not available.
13 The lightweight platform can be set up and taken down in a
14 relatively short period of time and can be rigged for stowage on
15 a submarine allowing missile tube access in remote areas.

16 It will, therefore, be appreciated that a lightweight
17 platform has been described, which can be carried and assembled
18 by two men and that can be used to allow for the efficient
19 servicing of VLS equipped submarines and other similar vessels.

20 While the present invention has been described in
21 connection with the preferred embodiments of the various
22 figures, it is to be understood that other similar embodiments
23 may be used or modifications and additions may be made to the

1 described embodiment for performing the same function of the
2 present invention without deviating therefrom. Therefore, the
3 present invention should not be limited to any single
4 embodiment, but rather construed in breadth and scope,
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5 ABSTRACT OF THE DISCLOSURE

6 A platform for servicing of vertically positioned missiles
7 in a ballistic missile submarine. The platform includes a
8 vertically inclined rail and a horizontal frame. In the frame
9 there is a first element having a first and a second end
10 superimposed over the inclined rail. This first element is
11 movably mounted directly on the rail at the first end and
12 movably mounted in vertically spaced relation above said
13 inclined rail at said second end. At least one second element
14 is spaced laterally from the first element to enclose a missile
15 tube access opening. A vertical support means is also
16 positioned in opposed relation to the inclined rail. The
17 vertical support means is adjustable to the curved hull surface
18 of the submarine to maintain the frame horizontal. The platform
19 is constructed from a lightweight material such as aluminum, and
20 it can be carried and assembled by two men for the efficient
21 servicing of VLS equipped submarines and other similar vessels.

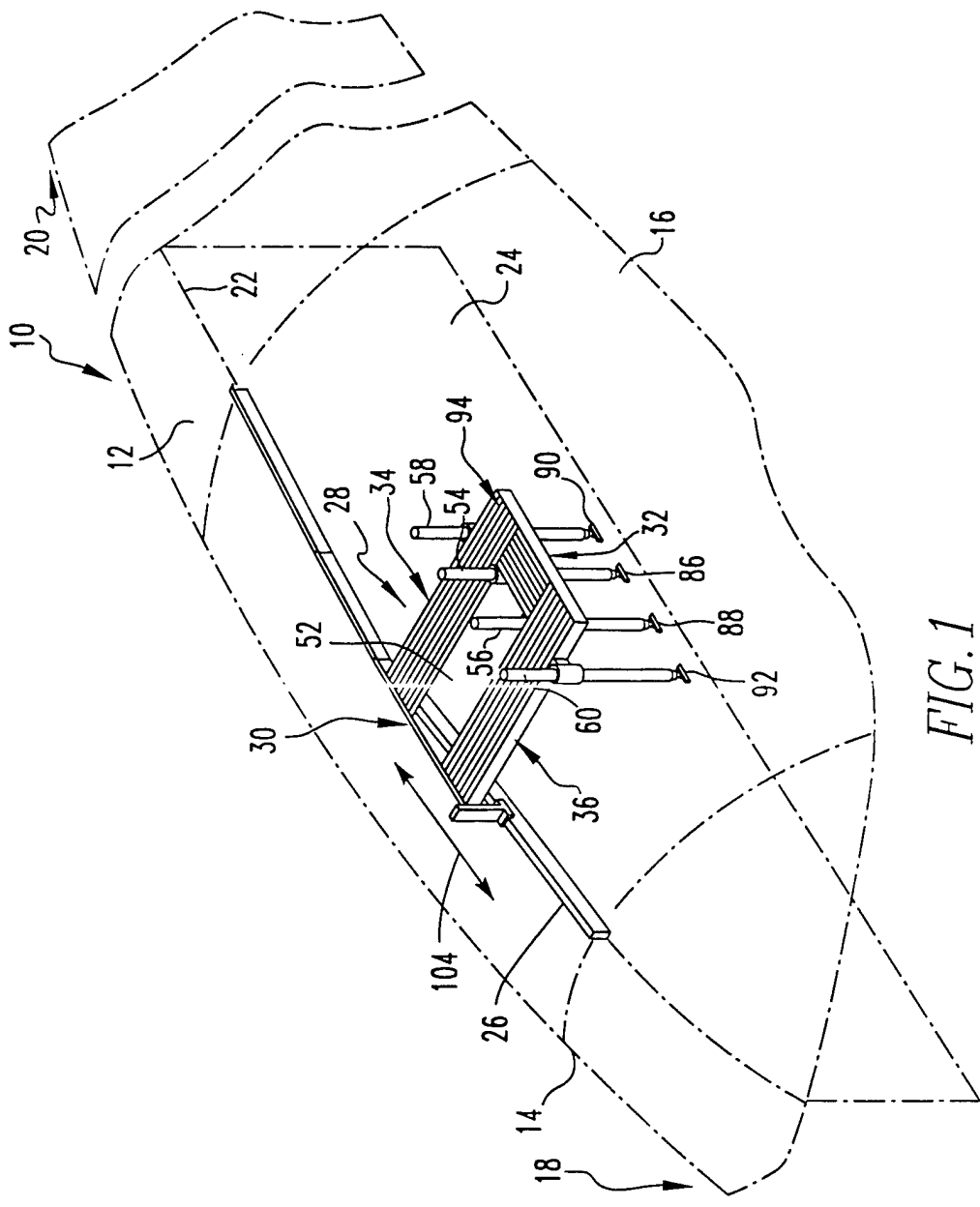


FIG. 1

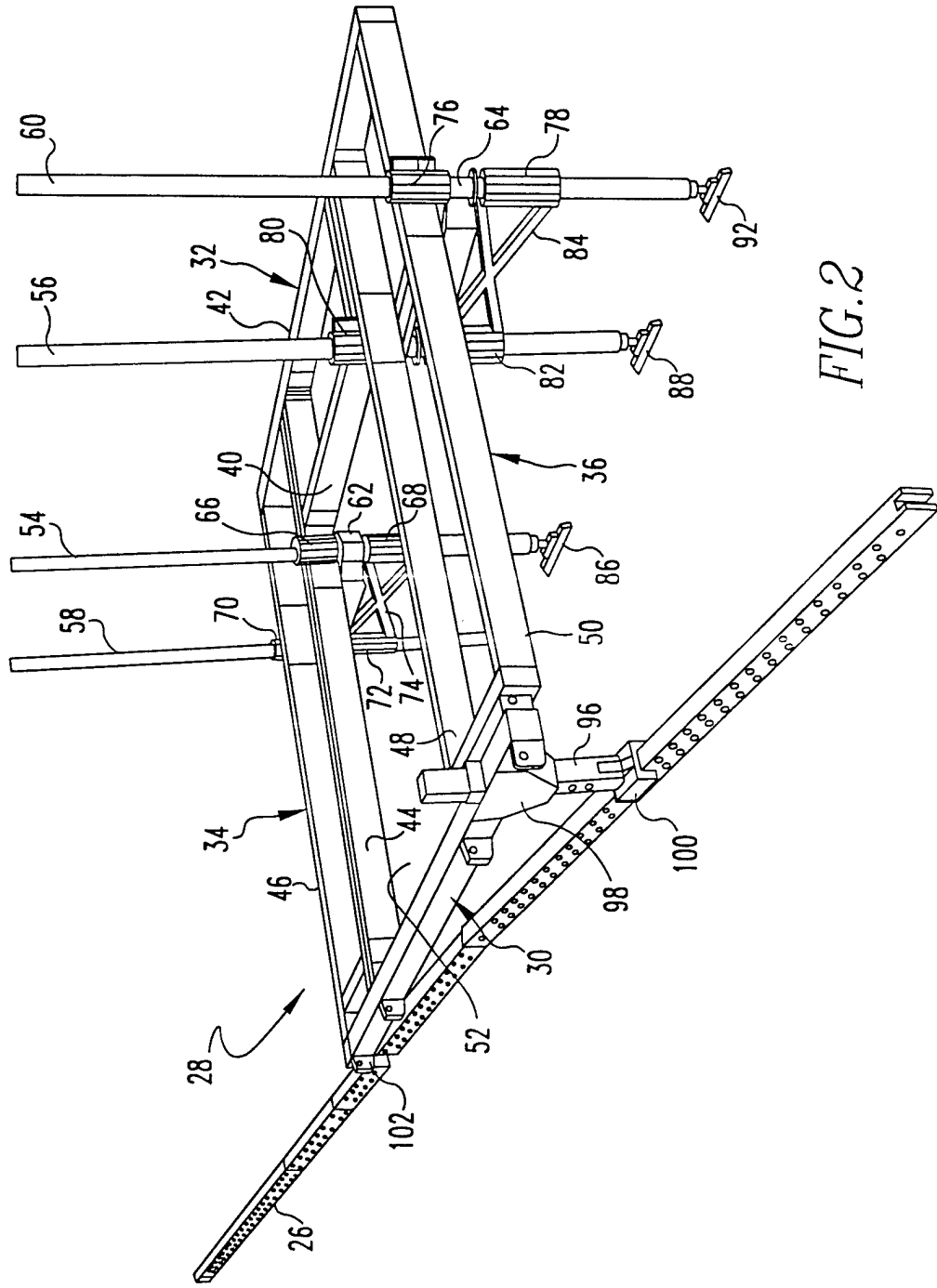


FIG. 2