March 29, 1949. T. L. TAYLOR ET AL 2,465,944

BUOYANT BARRIER

Filed Oct. 1, 1946 4 Sheets-Sheet 1

Fig. 1.

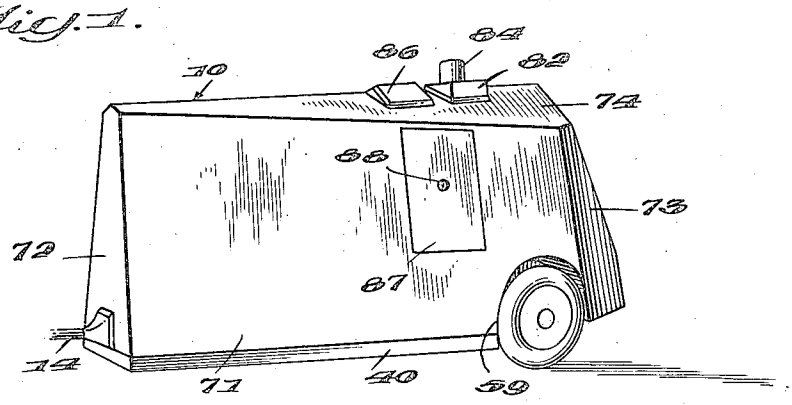
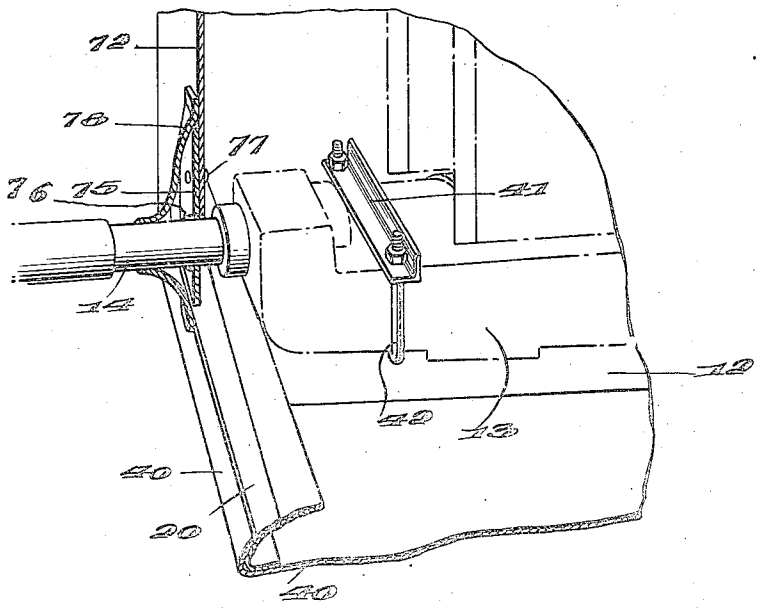


Fig. 2.



Inventors
THOMAS L. TAYLOR,
CHAUNCEY F. BELL, JR.
RICHARD K. WENTZ,

By Donald W. Farrington
Attorney

March 29, 1949. T. L. TAYLOR ET AL 2,465,944

BUOYANT BARRIER

Filed Oct. 1, 1946 4 Sheets-Sheet 2

Fig. 2.

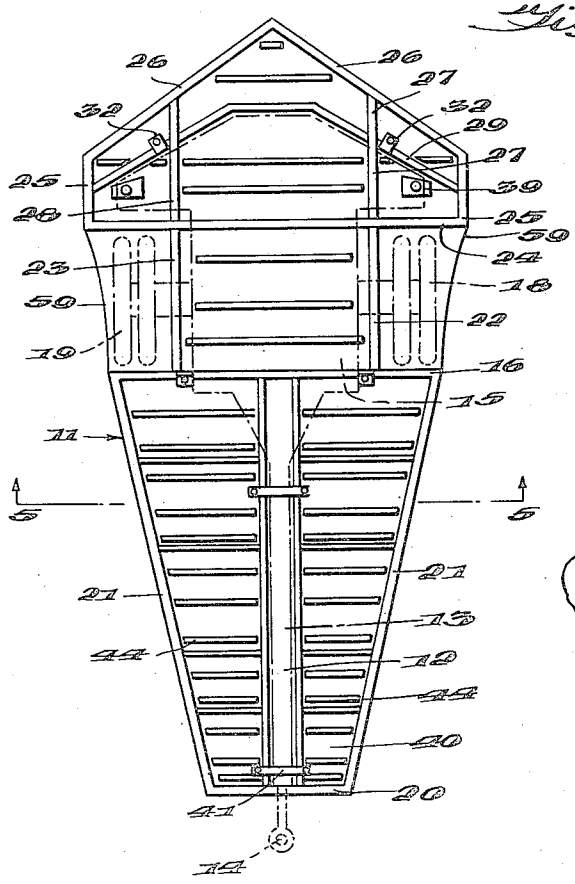


Fig. 3.

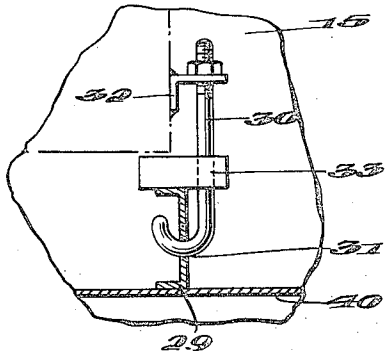
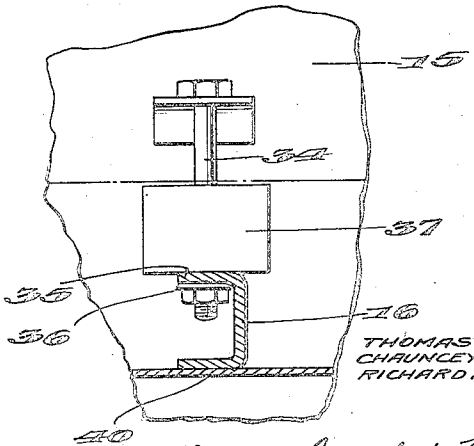


Fig. 4.



Inventors
THOMAS L. TAYLOR,
CHAUNCEY F. BELL, JR.
RICHARD K. WENTZ,

By Donald W. Farrington

Attorney

March 29, 1949. T. L. TAYLOR ET AL 2,465,944

BUOYANT BARRIER

Filed Oct. 1, 1946 4 Sheets-Sheet 3

Fig. 5.

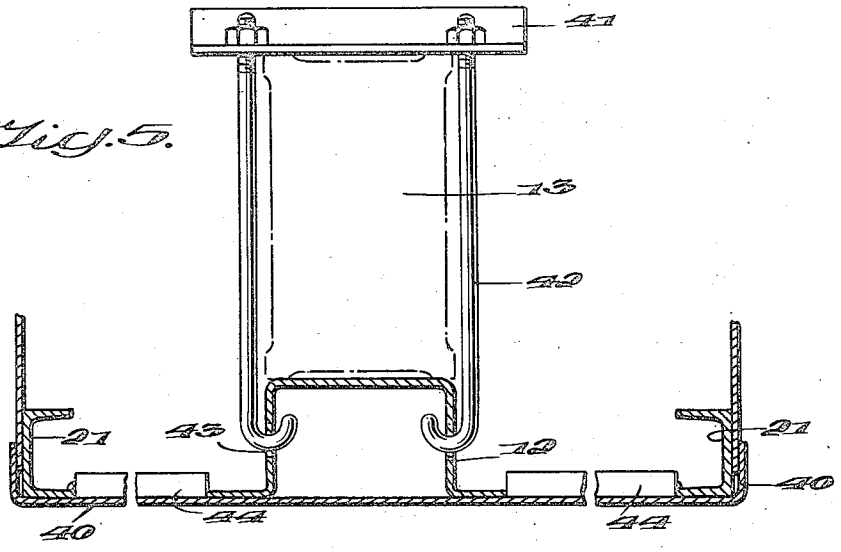
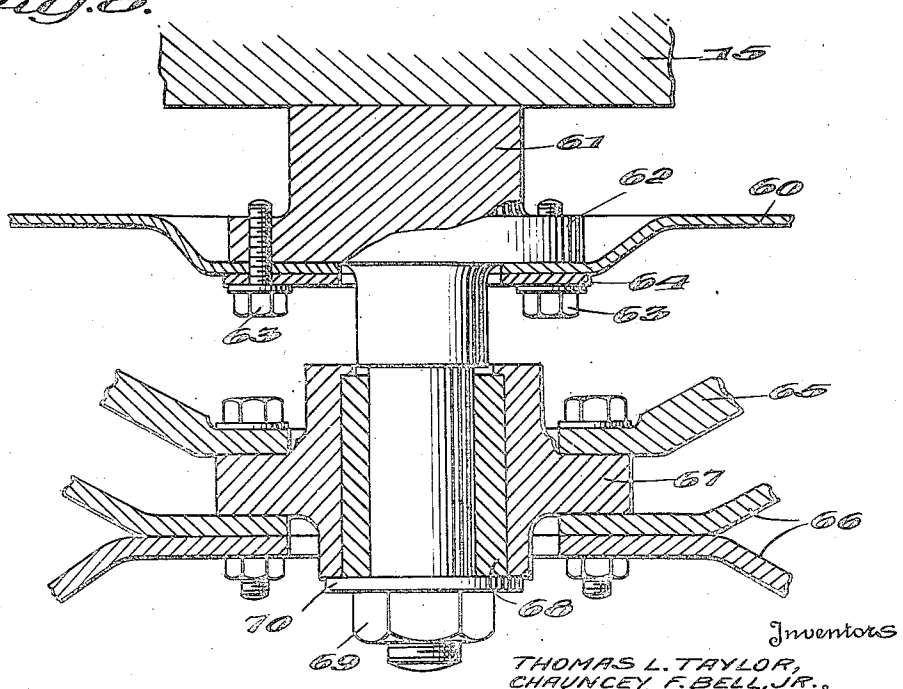


Fig. 6.



Inventors

THOMAS L. TAYLOR,
CHAUNCEY F. BELL, JR.,
RICHARD K. WENTZ,

By Donald W. Farrington

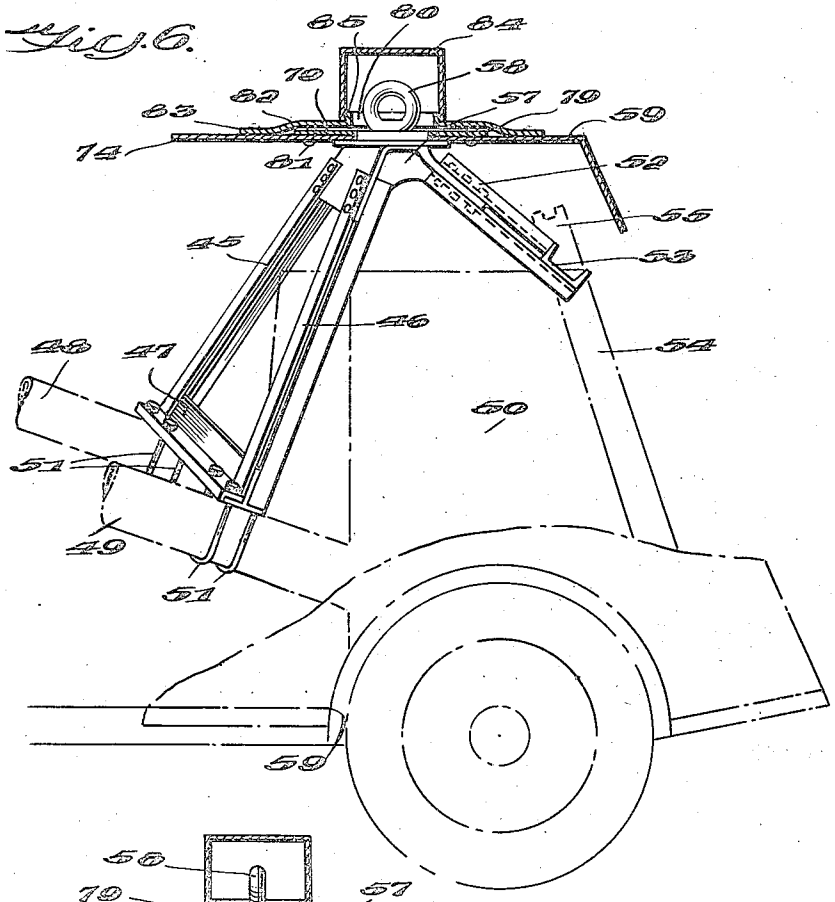
Attorney

March 29, 1949. T. L. TAYLOR ET AL 2,465,944

BUOYANT BARRIER

Filed Oct. 1, 1946 4 Sheets-Sheet 4

Fig. 6.



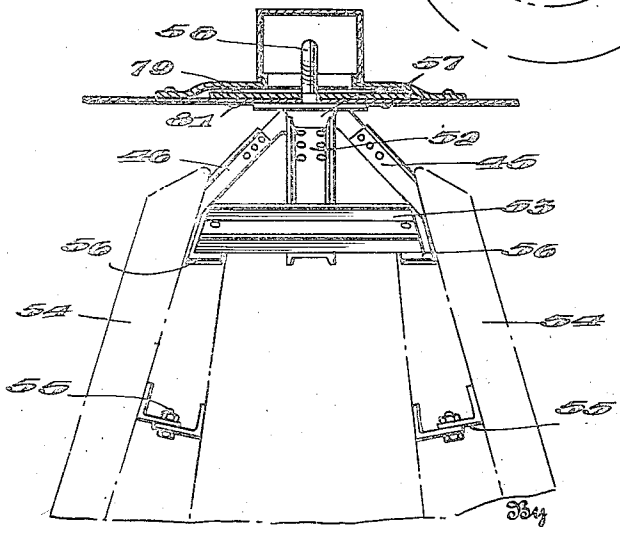


Fig. 7.

Inventors

THOMAS L. TAYLOR,
CHAUNCEY F. BELL, JR.
RICHARD K. WENTZ.

Donald W. Farrington

Attorney

Patented Mar. 29, 1949

2,465,944

UNITED STATES PATENT OFFICE

2,465,944

BUOYANT BARRIER

Thomas L. Taylor, Ruxton, and Chauncey F. Bell, Jr., and Richard K. Wentz, Baltimore, Md., assignors to The Glenn L. Martin Company, Middle River, Md., a corporation of Maryland

Application October 1, 1946, Serial No. 700,418

9 Claims. (Cl. 89—1)

1

Our invention relates to a buoyant barrier for storing a mobile gun unit in condition for ready removal and use.

Present day development of ordnance has provided efficient anti-aircraft guns mounted on pneumatic tires for high speed transportation. The gun load is centered over a single axle assembly which adapts the gun for ready attachment to a motorized unit as a trailer unit. The purpose and design of such a mounting is to add greater mobility to the unit for tactical dispersal to a strategic point for use. Over extended periods of non-use it is highly desirable that the gun be so stored as to be ready for immediate use and yet provided with sufficient protection to prevent corrosion of the operating parts by the admission of moisture, fumes, and like corrosion-inducive elements, as well as damage inflicted by the infiltration dust, fungi, and like foreign materials. This protection is accomplished by sealing the unit within a barrier formed of corrosion-resistant, light-weight sheet material which entirely closes the unit and is equipped with moisture balancing equipment capable of removing undesirable moisture as well as screening out foreign substances. The efficiency of these storage units has been proved in practice, however, one of the problems remaining unsolved up to this time has been that of continuing the protection without loss of mobility. Experience gained in the last war is that tactical dispersal of this equipment may involve movement for long distances over land and water. Furthermore, landings from a carrier must often be made directly on to beaches where wharfage is not available, such as in territory previously held by the enemy who has demolished all wharf facilities, or where landings are made from the open sea. In these instances, storage facilities that provide buoyancy capable of sustaining the entire unit allow the ordnance to be floated to shore as a part of the landing operation while still maintaining protection to the gun parts and yet can be readily removed after the gun has been drawn to a strategic point for use.

Our invention provides a novel protecting barrier wherein light-weight, non-corrosive material is sealed around a mobile gun unit equipped with wheels protruding therefrom, while providing sufficient buoyancy and mobility to permit the unit to be drawn through water and over land without the loss of protection as a sealed enclosure.

It is among the objects of our invention to

2

provide a buoyant container for a mobile gun capable of being used as a landing float.

Another object is to provide a barrier against admission of corrosion producing substances for storage of a mobile gun maintained in condition for immediate movement and use.

A further object is to provide a storage means that facilitates landing of a gun stored therein directly from a ship to a beach installation.

A still further object is to combine an inexpensive, quickly removable barrier adapted for installation around a mobile gun unit with pressure balancing equipment capable of maintaining the interior of the barrier at a predetermined atmospheric condition so as to prohibit corrosion of the parts of a gun stored therein over an indefinite period of time.

Other objects of this invention will be more apparent from the following description as set forth in connection with the accompanying drawings, in which:

Figure 1 is a side view of the article of our invention in installed position as a protecting barrier enclosing the operating mechanism of a mobile gun.

Figure 2 is a plan view of the base frame.

Figure 3 is a fragmentary sectional view of the rear suspension hooks.

Figure 4 is a fragmentary sectional view of the intermediate suspension bolts.

Figure 5 is a detail in section taken on the line 5—5 of Figure 2.

Figure 6 is a side perspective view of the hoist-eye structure assembly.

Figure 7 is a fragmentary rear perspective view of the hoist-eye structure.

Figure 8 is a partial fragmentary sectional view of the wheel well assembly.

Figure 9 is a partial fragmentary sectional view of the front end suspension and seal.

Referring more particularly to the drawings, Figure 1 illustrates our invention in its preferred form installed as a buoyant barrier enclosing a 90 mm. anti-aircraft gun of the mobile type equipped with hydraulic recoil cylinders and outrigger members mounted on a gun bed centered over a single set of wheels. The barrier 10 consists of an enclosure formed of aluminum alloy sheet stock supported by a reinforced base removably attached to and suspended from the gun bed. The barrier 10 is of sufficient over-all dimensions to completely envelope the gun stored within with sufficient space allowed so that the gun is maintained entirely free from direct contact with the enclosing top and walls.

The reinforced base 11 (Fig. 2) consists of a platform-like structure formed of aluminum alloy channel members welded together and reinforced to form an integral structure covered by a bottom sheet 40 welded to the channel members and reinforcings. It is shaped to conform to the general outline of the gun unit which is comprised of the barrel, firing mechanism, cylindrical recoil units and jointed outrigger arms mounted on a gun bed 15 and trail piece 13. The trail piece 13 has one end rigidly affixed to the gun bed with the other end equipped with a draw bar 14 adapted for attachment to a mechanized drawing unit. There is sufficient space provided inside the barrier 10 for the inclusion of spare parts and accessories when the gun unit is placed therein for protection. The normal bulk and weight of the gun being centered around the rear end of the wheel assembly allows for the barrier to be formed with a narrow front end portion enclosing the front end of the trail piece from which the draw bar extends beyond the enclosure.

The integrally formed base frame 11 is provided with inwardly spaced frame sections adjacent the wheels so as not to destroy the mobility of the gun when completely enclosed. The novel means by which the base frame is suspended to the gun bed 15 and trail piece 13 allows for utilization of the rigidity of the gun unit in supporting the barrier without the use of excess material which would add to the shipping weight of the structure. The shape of the gun is further utilized in attaining this structure, wherein an aluminum alloy channel beam 12 is arranged in an inverted position for alignment with the trail piece 13 to extend from the draw bar portion 14 to a point under the gun bed 15 spaced forward of the wheels. A transverse stringer 16, adapted for alignment with the fore part of the gun bed 15, is weld-joined to the end of the beam 12 with its ends extending outwardly on each side of the gun to points outside of the outer wall surfaces of the tires mounted on dual wheel assemblies 18 and 19. This transverse stringer also forms forward anchorage for the mud guards hereinafter described.

A front support for the barrier is provided by the front end channel member 20 weld-joined to the front end of the center beam 12, and the enclosing form of the frame is completed by side members 21 welded to each end of transverse stringer 16 and end member 20, as shown in Figure 2. Extending rearwardly from the transverse stringer 16 are lateral stringers 22 and 23 placed laterally of the gun bed 15 and spaced inwardly of the wheel assemblies 18 and 19 to join with a second transverse stringer 24, slightly greater in length than the transverse stringer 16, to allow for the increased width of the gun rearward of the wheels. The second stringer 24 is weld-joined to side members 25, and end members 26 which are joined together to form a continuous tail frame supported by extensions 27 and 28 of lateral stringers 22 and 23, respectively, to provide additional rigidity to the base frame. This latter portion of the structure, which constitutes the rear portion of frame 11, is provided with a suspension girder 29 attached at each end to the side members 25 and intervening lateral members 27 and 28, and is positioned for suspended attachment to the rear face of gun bed 15 by a plurality of hook bolts 30 (Fig. 3) inserted through apertures 31 in girder 29 and bolted through brackets 32 affixed to the gun bed 15, preferably

by being welded thereto. Inasmuch as the bottom plane of the gun bed 15 is slightly raised at these points above a plane common to its other support points, compensating blocks 33 are fitted to bolts 30 for insertion between the gun bed and girder.

The longitudinal inverted channel beam 12 provides support for the fore part of the base frame 11 and is arranged for longitudinal alignment with the trail piece 13. When the base frame 11 is placed in position under a gun to be enclosed with the beam 12 aligned with the gun trail piece 13 it is secured and supported therefrom by means of hook bolt assemblies arranged at fore and aft positions along the trail piece. These assemblies consist of angle iron clamps 41 bolted over the front and rear ends of the trail piece 13 by hook bolts 42 hooked in apertures 43 formed in the side walls of beam 12, as shown in Figures 2, 5 and 9.

An under surface sheet 40 of aluminum alloy sheet stock is affixed to the under surface of the base frame 11 with extended edges extending upwardly over the edges of the channelled frame members to form a weld junction with the side walls, hereinafter discussed. To prevent the bottom sheet 40 from sagging and pulling away from the cross members to which it is weld-attached we consider it advisable to provide additional rigidity by the weld attachment of a plurality of aluminum alloy strips 44 to the inner surface of the bottom sheet.

Additional reinforcing is provided by reinforcing plates 39 (Fig. 2) which are positioned under the regular support points of the gun located at each side of the bed 15 rearward of the wheels so as to protect the bottom sheet 40 from injury and also provide jack points, so marked on the ouside of the barrier, for use in placing a jack under the gun. It is obvious that any such jacking operation would injure the enclosing structure unless force exerted thereon is directed to the gun bed proper.

Means for hoisting the unit is provided by a hoist-eye surmounting a hoist connector or lift structure formed of channel and angle members centered over and attached to the gun, as shown in Figure 6. The lift structure is formed as a tripod with the two front legs 45 and 46 welded to a T-shaped cross member 47 extending between the two recoil counterpoise cylinders 48 and 49 of the gun mechanism 50 and are attached thereto with U-bolts 51. The rear leg 52 is formed of two channel members welded to a cross channel member 53 extending between the outrigger legs 54 (Figs. 6 and 7.)

Ready removal of the hoist attachment rear leg 52 from the outrigger legs, which are normally lowered to the ground when the gun is in firing position, is provided for by the arrangement of the bolted assembly clips 56 welded to the outriggers to form mooring points for each end of the cross member 53. Likewise, bracket assemblies 55 affixed between the outrigger legs and the gun mechanism 50 securely hold the outriggers in their normal folded positions assumed during all other positions than that of firing, and yet allow for quick disengagement and extension to their supporting positions when the gun is to be readied for firing. The hoist-eye unit 57 is bolted to the tripod legs and positioned to extend the eye portion 58 above the plane of the top barrier sheet 74 hereinafter described.

The wheel wells are formed with mud guards

59 (Figs. 1, 2 and 6) of aluminum alloy sheet stock positioned to extend between the transverse stringers 16 and 24 to cover each wheel assembly 18 and 19. These wells are formed water-tight against admission of water into the barrier by the arrangement of back wall plates 60 (Fig. 8) fitted around the axle spindles 61 with their top edges welded to the inside of the mud guards and the bottom edges welded to the lateral stringers 22 and 23 in overlapped relationship with the bottom sheet 40. Details of the water-tight joint formed by the back plate 60 with the axle spindle 61 rigidly affixed to the gun bed 15 are shown in Figure 8. The back plate 60 is apertured for bolted attachment to the brake assembly hanger abutments 62, from which the brake assembly is first removed, and attached thereto by bolts 63 inserted through seal ring 64. At the time of installation, we find it advisable to coat the joint areas of these parts with zinc chromate paste to guard against any corrosive action or the admission of moisture therebetween. The back plate 60 is formed inwardly from the inner periphery of the wheel assembly so as to provide clearance for the brake drum 65 and the wheel discs 66 attached to the hub 67 journalled on a conventional bearing 68, and provided with a wheel nut 69 and retainer 70.

The main protecting enclosure consists of aluminum alloy sheets welded together to form an integral cover unit having side walls 71, front wall 72, rear wall 73, and top 74 adapted to be placed over the gun unit assembly with the bottom edges of the wall sheets extending over the edges of the side and end members of the base frame 11 to form an overlapping juncture with the bottom sheet 40 sealed thereto by welding. Additional closure protection against the admission of water is provided around the draw bar 14 which protrudes from the front end of the barrier. Details of this additional protection are shown in Figure 9. An apertured steel plate 75 is welded around the draw bar 14 at 76 and bolted to the front wall sheet 72 with bolts 77. A coating of zinc chromate paste is first applied to the joint to form a corrosion-resistant seal between plate 75 and the front wall sheet 72 of the barrier. Additional protection against the admission of moisture is provided by an enclosure seal 78 formed of aluminum alloy sheet stock and adapted to fit over the aforementioned seal assembly and is welded directly to the front wall sheet 72 and the overlapped edge of the bottom sheet 40, as shown in Figures 1 and 9. The same type of double seal protection is provided for the hoist-eye opening through the top of the barrier (see Fig. 6) by the installation of a steel ring plate 79 weld-attached and secured to the top sheet 74 with bolts 81, or similar securing means. Corrosive action between the seal ring 79 and top sheet 74 is prevented by the application of a coating of zinc chromate paste to their joined surfaces prior to assembly. Further protection against the admission of moisture is also provided by the addition of a top seal plate 82 formed of aluminum alloy and arranged to provide an upstanding shoulder 85 encircling the hoist-eye with the outer periphery 83 of the plate welded to the top sheet. An aluminum alloy cap 84 is fitted to encircle the upstanding shoulder 85 and provides a cover for the hoist-eye opening ready of removal upon occasion for use of the eye hook.

A conventional solar radiation breather unit 86, positioned in the top of the barrier 10, provides for equalization of air pressures inside of

the barrier with outside pressures caused by changes in climatic conditions. A sufficient quantity of desiccant material, such as silica gel, is placed in the barrier and breather so that a relative humidity condition below 30° is maintained in the barrier at all times during use. This humidity condition is such as to prevent any tendency of the mechanical parts of the gun to rust or corrode. The breather is the customary type of solar radiation breather, well known in the art, and it is not intended that the breather or the use of desiccant material form a part of this invention.

Means for access to the gun for inspection and the testing of humidity under storage conditions is provided for by an inspection door 87 and peep hole 88 fitted therein and sealed against the admission of undesired moisture.

In its sealed condition, with all permanent joints weld-sealed, the barrier provides protection against the admission of moisture, fungus, dirt or any other undesired foreign particles for an indefinite period of time. Furthermore, the buoyant characteristics of the barrier, based upon its cubic foot displacement of 510 feet, are such that it will support a total load of 32,000 lbs. with approximately ⅔ submersion in fresh water. The gross weight of the barrier and its conventional load, namely, that of the 90 mm. gun with accessories amounts to approximately 21,865 lbs. which provides ample buoyancy to allow a gun so protected in such a barrier unit to be unloaded directly into the water from a landing craft from where it can be readily towed to the shore by a line or other towing means and drawn to a place of use without interruption to the protection afforded the enclosed gun. After the unit has been towed and/or drawn to a point for tactical use, the barrier may be readily cut away from the gun with an axe, or similar cutting tool. The bolts used for holding the hoist-eye and base frame in place are purposely sized to fit a common wrench carried as part of the gun equipment, all of which is designed to provide for quick use of the gun without the delay formerly required for cleaning and conditioning.

Although our invention is shown and described in considerable detail, it is to be understood that certain changes, alterations, modifications and substitutions may be made without departing from the spirit and scope of the appended claims.

We claim as our invention:

1. A buoyant barrier for a mobile gun having a bed portion mounted between oppositely disposed wheels and an extended draw bar comprising a base frame adapted to be suspended from the gun bed having a gun draw bar adapted to extend beyond the end of said frame, wheel wells carried by the frame with seal means adapted to fit around each wheel, a bottom sheet attached to and supported by the frame, a hoist connector adapted to be centered over and attached to the gun unit and connected thereto as an attachment means for the attachment of a hoist, a surrounding enclosure comprised of a front wall having an opening adapted to accommodate sealed protrusion of said draw bar therethrough, side walls, a rear wall, and a top supported by said suspended base frame with the edges of said walls joined to the bottom sheet and the outside peripheries of the wheel wells to form a buoyant structure with said top being sealably apertured to accommodate protrusion therethrough of a part of the hoist connector.

2. A buoyant barrier for a mobile gun having

cylindrical recoil absorbing units, a firing mechanism, outrigger members, a draw bar and trail piece attached to a gun bed mounted on wheels comprising a base frame having spaced stringers extending transversely of each other terminating at the sides and ends of the frame, a metallic bottom sheet arranged to cover the bottom of said frame and over-lap the sides and ends thereof, suspension means adapted to be suspended from the gun bed and trail piece for suspending the base frame therefrom, securing means adapted to secure the outrigger members to the firing mechanism, a hoist connector comprised of a centered hoist eye, two legs adapted for connection to the cylindrical recoil absorbing units and a third leg arranged for connection to the outrigger members, at least two wheel wells formed with metallic mud guards arranged to extend between two of the transverse stringers adapted to be spaced from the wheels with metallic seal plates adapted for attachment inwardly of said wheels between the bottom sheet and the inner edge of each mud guard, an enclosing sheet metal structure having front, rear, and side walls and a top formed as a unitary structure, with said front wall adapted to provide a sealable aperture surrounding the gun draw bar, and the top formed with a sealable opening as a means of access to the hoist eye, adapted for surrounding said gun with the bottom edges of said side and end walls being joined to the bottom sheet and the outer peripheries of the wheel wells to form a watertight enclosure.

3. A buoyant barrier for a mobile gun unit having a bed member and extended draw bar mounted on wheels comprising a base frame having spaced support stringers connecting with side and end channelled members adapted for suspension from the gun bed, suspension means adapted to suspend said base frame under the gun unit, a bottom sheet positioned adjacent the base frame to form a sealable bottom, wheel wells attached to the frame and wheel supports at each side of the unit, a hoist connector having a hoist eye positioned above and adapted to be connected to the gun for lifting thereof, a surrounding enclosure comprised of a front wall provided with a sealable opening adapted to accommodate the extended draw bar positioned therethrough, side and rear walls and a top attached together and seal connected to said bottom, and a sealable opening in said top positioned to provide access to the hoist connector.

4. A buoyant barrier for a mobile gun mounted between oppositely disposed wheels comprising a closed base frame of substantially the same base dimensions as the gun and formed and adapted to be with a surrounding edge having a flat weld surface suspended from said gun free of the wheels, wheel wells formed and adapted to extend over the wheels with a back wall portion adapted to be spaced inwardly of the wheels and adapted to be seal joined to the frame free of said wheels, a surrounding enclosure supported by the base frame comprised of front, side, and end walls surmounted by a top sealed together and sealably joined to said surrounding edge and wheel wells with sealable access means provided in the walls and top of the enclosure adapted to accommodate application of pull and lift forces to the gun.

5. An enclosure for a mobile gun having a bed, trail piece and a draw bar mounted between oppositely disposed wheels comprising a covered base frame adapted to be suspended from the

bed and trail piece with the draw bar adapted to be extended beyond said frame, a suitable covering sealed to and adapted to be supported by the base frame and wheel wells having a sealing wall adapted to be spaced inwardly and free of the wheels, a sealable opening in the covering adapted to accommodate the extended draw bar, and seal means adapted to be positioned around said draw bar and connected to the covering for sealing the enclosure relative thereto.

6. A buoyant barrier for a mobile gun having a bed portion mounted on the wheels and an extended draw bar comprising a covered frame adapted to be suspended from the gun bed with the gun draw bar adapted to be extended beyond the end of said frame, wheel wells adapted to be spaced from the wheels with the ends of said wells joined to the frame, an A-structure adapted to be centered over the gun and attached thereto to provide a hoist attachment means, a surrounding enclosure comprised of a front wall formed with a sealable opening adapted for insertion therethrough of said extended draw bar, a side wall, a rear wall, and a top portion joined together, sealed to, and supported by the suspended frame with adjacent edges of said walls joined to the frame and the wheel wells to form a buoyant structure with said top being sealably apertured to accommodate a portion of the A-structure extended therethrough.

7. A buoyant barrier for a mobile gun having cylindrical recoil units, outrigger members, a trail piece, a draw bar and a bed frame mounted on suitably axled wheels comprising a base frame having spaced stringers and side members, a sheet metal covering attached to the frame, suspension means adapted for dependent attachment to the trail piece and gun bed frame for suspension of the base frame therefrom and arranged for ready disengagement, securing means associated with the gun adapted to secure the outrigger members in collapsed position, a hoist connector having a front portion adapted for securing to the recoil units and a rear portion adapted for securing to the outrigger members and topped by a hoist attaching means, wheel wells formed of sheet metal attached to the bottom sheet and provided with apertures adapted to be seal fitted around the wheel axles, an enclosing sheet metal structure formed with front, side and rear walls surmounted by a top having the bottom edge thereof weld joined to the bottom sheet and wheel wells, said front being formed with an opening adapted to sealably receive the draw bar with an end thereof extended beyond the enclosure for application of motive force, the top of said enclosing structure being formed with a sealable opening to accommodate extrusion of the hoist attaching means for application of lift force to the gun.

8. In combination with a mobile gun unit having a centered bed portion mounted on wheels extended outwardly therefrom and provided with a draw bar connection to and extended forwardly of the gun, an enclosure comprising a frame member suspended under the gun, a sheet metal covering seal fitted to said frame member and spaced from the wheels, a lift means attached to the gun having a lift point substantially centered over the gun relative to its center of gravity for attachment of a hoist to said gun, a rigid sheet metal covering carried by and in sealable engagement with said frame member adapted to enclose said gun with the draw bar, wheels, and lift point arranged as protruding members,

and seal means connecting said protruding members with the covering.

9. In combination with a mobile gun mounted on wheels and having a forwardly extended draw bar, a hoist attachment means attached to the gun to provide for lifting thereof, an enclosure surrounding the gun and supported thereby with the draw bar, wheels, and hoist attachment means protruding therefrom and seal means provided between said enclosure and said protruding members adapted to exclude the admission of undesired moisture to said gun.

THOMAS L. TAYLOR.
CHAUNCEY F. BELL, JR.
RICHARD K. WENTZ.

No references cited.