Aug. 25, 1936. F. R. RUEPPEL 2,052,491

CARTRIDGE TANK

Filed Nov. 20, 1935 4 Sheets-Sheet 1

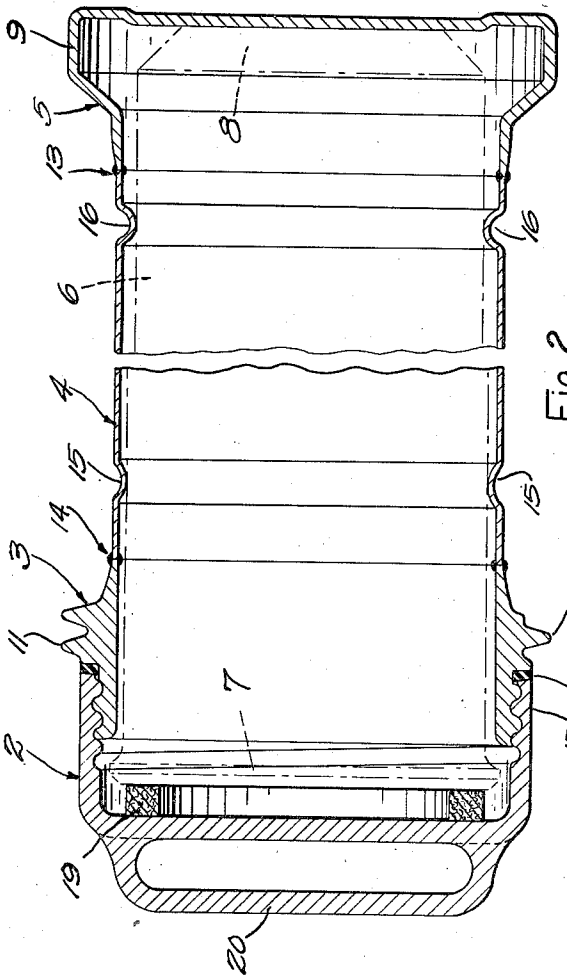

Fig. 2

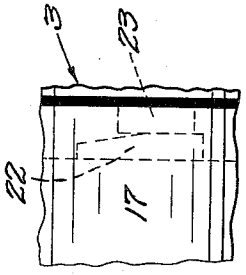

Fig. 4

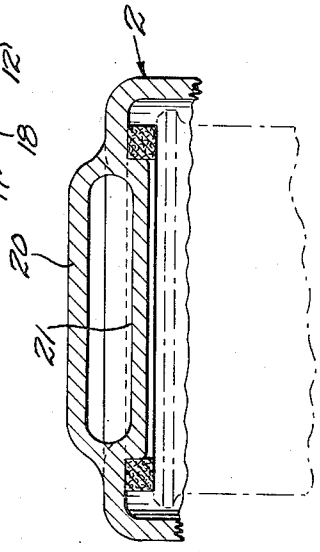

Fig. 3

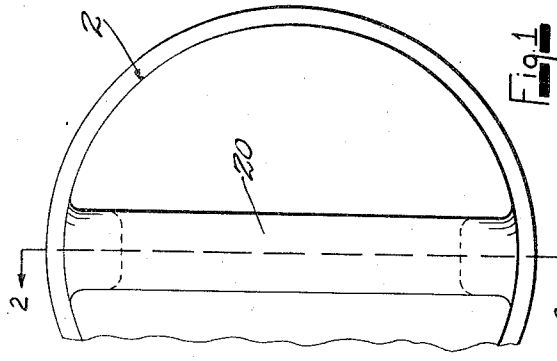

Fig. 1

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Aug. 25, 1936. F. R. RUEPPEL 2,052,491

CARTRIDGE TANK

Filed Nov. 20, 1935 4 Sheets-Sheet 2

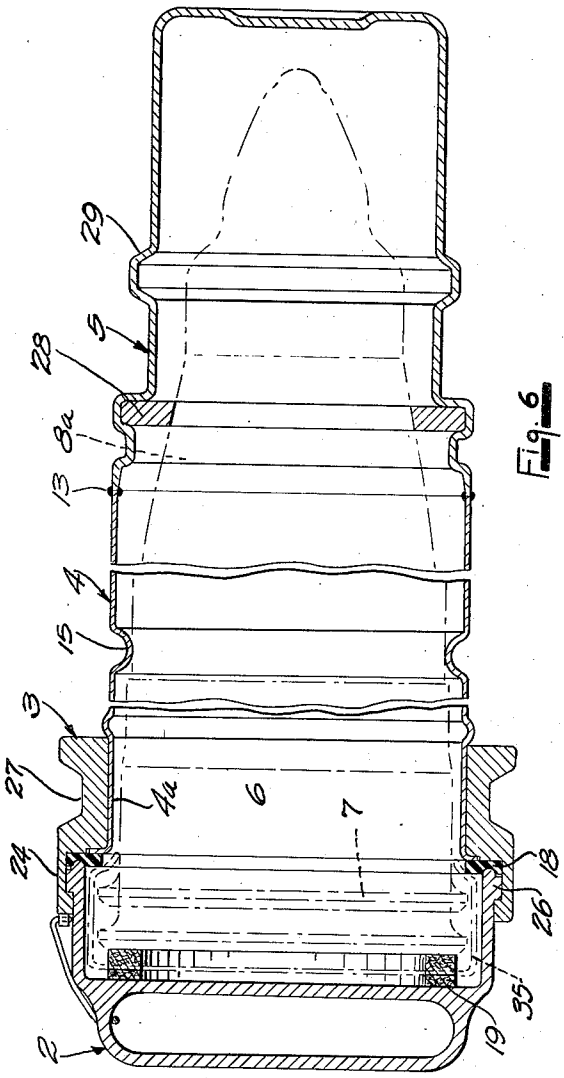

Fig. 6

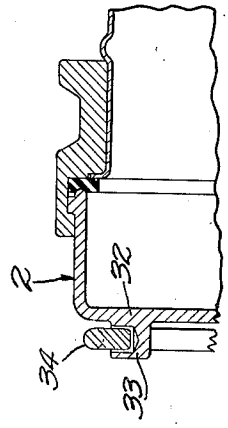

Fig. 8

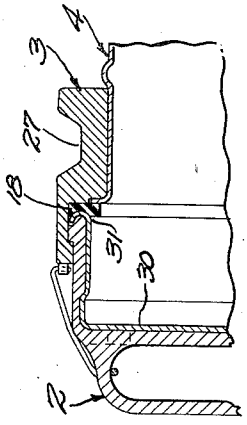

Fig. 7

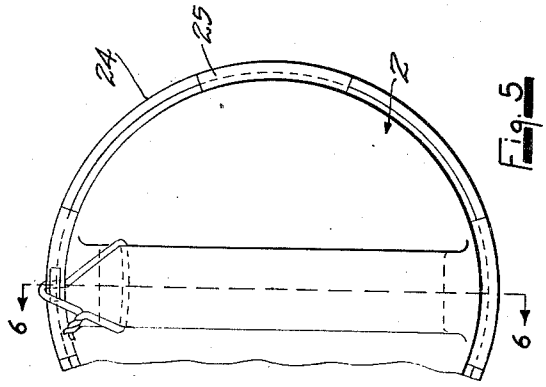

Fig. 5

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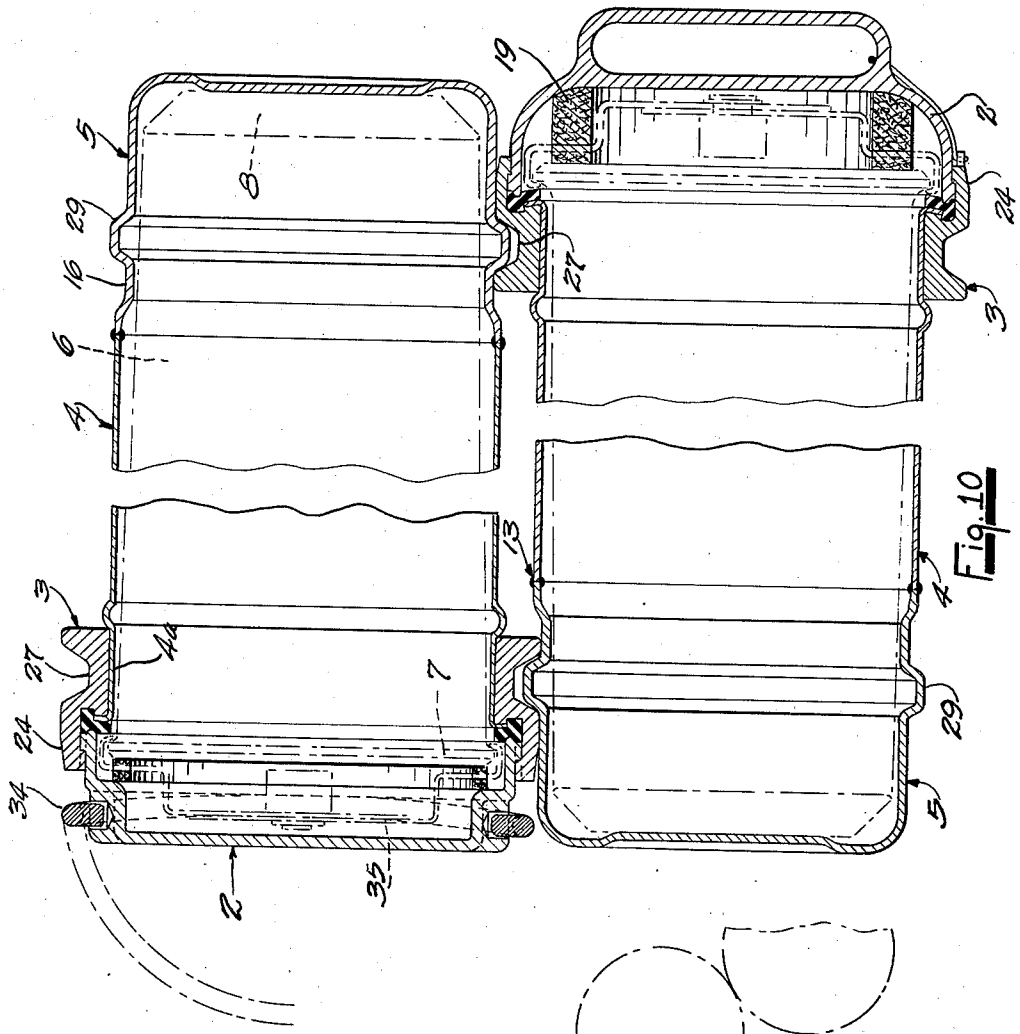

Fig. 10

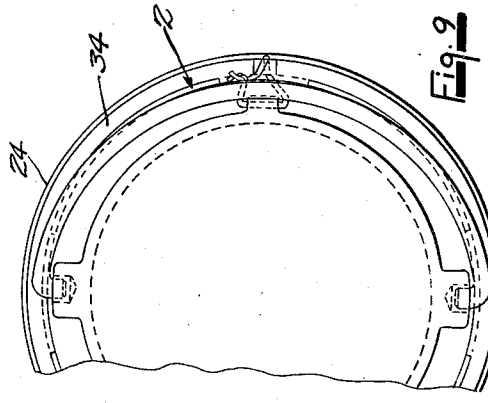

Fig. 9

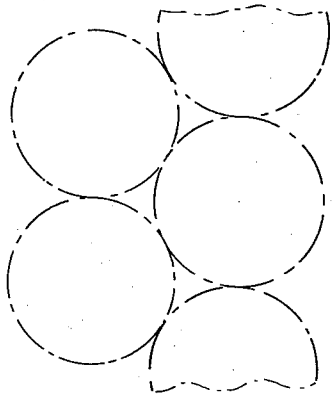

Fig. 11

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CARTRIDGE TANK

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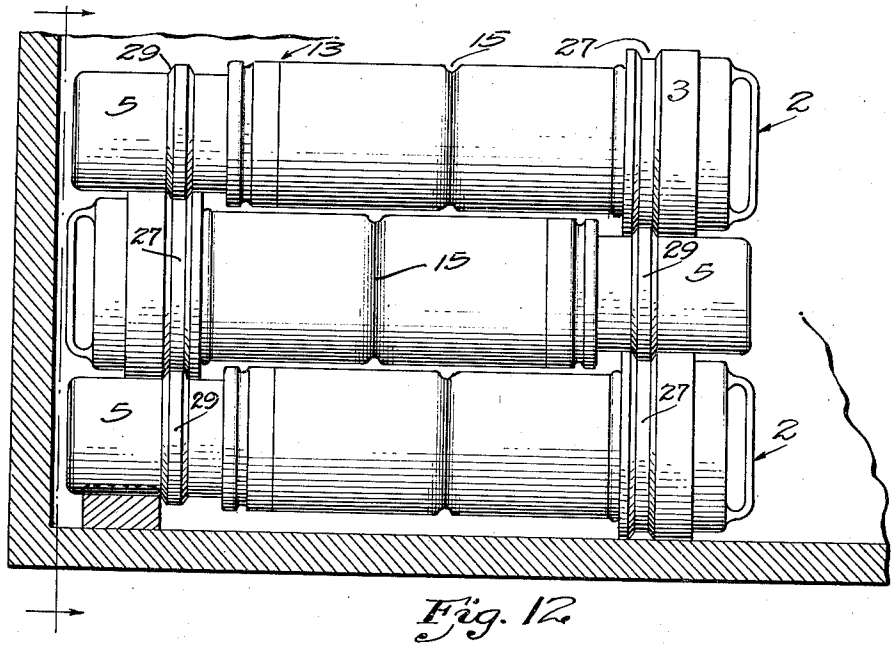

Fig. 12.

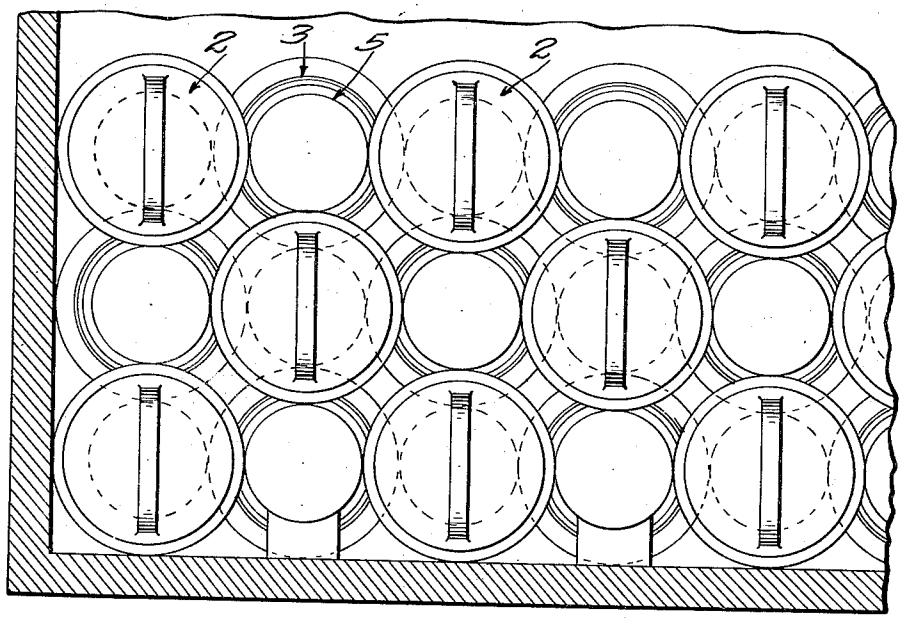

Fig. 13

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Patented Aug. 25, 1936 2,052,491

UNITED STATES PATENT OFFICE

2,052,491

CARTRIDGE TANK

Fred R. Rueppel, Detroit, Mich., assignor to Clayton & Lambert Manufacturing Company, Detroit, Mich., a corporation of Delaware

Application November 20, 1935, Serial No. 50,736

15 Claims. (Cl. 206—3)

This invention relates to ammunition tanks and has to do particularly with air tight stowage means adapted to safely store loaded cartridge shells within armour plate stowage magazines aboard ship.

With the gradual improvement in naval armament, the space and weight required for the stowage of cartridges have presented a very serious problem. The armour plate magazines for the cartridges are very heavy in themselves and to increase the size of these armour plate magazines would obviously diminish available space and increase the weight.

It is an object of the present invention to make it possible to materially decrease the size and weight of the armour plate stowage magazines, or to materially increase the stowage capacity of the present armour plate stowage magazines by providing tanks for the loaded cartridges of materially less weight and size as compared with the standard type of cartridge tanks now in use. More specifically, the present invention relates to a stowage tank of novel design and arrangement, the tank itself being so designed as to locate the top ring below the cartridge cap and eliminate all removable centering means, whereby the outside dimensions of the tank itself are considerably smaller than the present types of cartridge tanks utilizing means in addition to the tank walls for centering the cartridge shell and for removing the cartridge shell. Other important features have to do with the novel construction of the top ring, the reinforcing of the tank at the proper place to permit lighter construction throughout, the locating of the seal beneath the cartridge cap, the nesting of adjacent tanks and other features of design and arrangement as are more clearly brought out in the specification and claims.

In the drawings:

Fig. 1 is a plan view of one embodiment of the present invention and illustrating the simplicity of the cap and handle structure.

Fig. 2 is a longitudinal view taken on line 2—2 of Fig. 1 and illustrating the preferred unit construction of the tank which makes possible smaller overall dimensions and less weight.

Fig. 3 is a fragmentary sectional view illustrating a modified form of cap structure.

Fig. 4 is a fragmentary elevation illustrating a bayonet type locking means as a modified form for the screw locking means shown in Figure 2.

Fig. 5 is a plan view of a modified form of cap structure having bayonet type locking means.

Fig. 6 is a longitudinal sectional view taken on line 6—6 of Figure 5 and illustrating the modification and general tank design to adapt itself to projectiles of different shape and also illustrating a modified form of top ring structure, but where the effective part of the top ring is still positioned below the cartridge cap.

Fig. 7 illustrates a modified form of cap structure wherein the light material forming the greater part of the cap is cast around a sheet metal shape.

Fig. 8 is a fragmentary, enlarged section of a further modified form of cap and handle structure.

Fig. 9 is a plan view of a slightly modified form of a bayonet type cap structure.

Fig. 10 is a longitudinal sectional view of two cartridge tanks embodying the present invention and arranged for end to end nesting, the tanks being of the general type illustrated in Figure 2, but modified as to top ring and bottom construction.

Fig. 11 is a diagrammatic view illustrating one manner of stacking the tanks so as to effect compact stowing.

Fig. 12 is a view similar to Fig. 10 but, illustrating the type of tank shown in Fig. 6 in stacked relation.

Fig. 13 is a fragmentary end elevation of tanks stowed as shown in Figs. 10 and 11, with the cover and bottom ends of adjacent tanks reversed.

In general, the ammunition tank of the present application consists of four parts: a cover 2, a top ring 3, a body 4 and a bottom 5. A standard type cartridge case is shown in dash-dot lines as at 6, with the standard cap member shown as at 7 and a cork plug shown at 8.

In the form shown in Figure 2, the bottom member 5 is preferably in the form of a drawn sheet aluminum unit with projecting spacing members 9. The diameter of the annular spacing member 9 is preferably of the same diameter as the tongue and groove members 11 and 12, formed on the top ring 3, as will be presently described. The top ring 3 is preferably an aluminum alloy casting, and the body member 4 is formed of sheet aluminum, the body being welded to the bottom member 5 at the point 13 and the body and top ring being welded together at the point 14. The walls of the body member and the top part of the bottom member are preferably only slightly larger than the slightly tapering wall of the cartridge case and to properly position the cartridge casing within the tank unit, the body member is provided with annular in-

dentations 15 and 16. These indentations are substantially the same size as the outer diameter of the cartridge case with the result that the cartridge will be properly positioned within the tank without the need of any separate locating or spacing members.

It is often desired to have guiding means formed as a part of each tank which cooperate with adjacent tanks to properly guide and/or locate the tanks in the storage containers and to provide for this, in the form shown in Figure 5, I have formed groove and tongue members 11 and 12 as a part of the ring casting 3. Instead of a special design of ring member, extending up above the top 7 of the cartridge, and requiring separate removal clip members, I terminate the ring member 3 below the top 7 of the cartridge so as to provide ample room for the operator to directly grip the top of the cartridge when the cover 2 is removed.

As will be later explained, clip members may be used for withdrawing the cartridge from the tank without changing the compactness or design and/or cover as a whole. An important feature in terminating the top ring below the top or cap end 7 of the cartridge is to reduce the overall length of the tank to gain several pounds in reduction of overall weight. Furthermore, the locating of the top ring 3 just below the cap end of the cartridge case provides greater strength at the point most needed; if the top ring were positioned above the cartridge cap, it will be seen that the weight of the loaded tanks supported by the tanks in the bottom rows, or any impact between the heavy top end of the cartridge and the tank caused by heavy rolling of the ship or otherwise, would have to be taken by the relatively thin wall of the body portion.

By effectively bracing the tank at the point adjacent and just below the cap end of the cartridge, I have made it possible to cut down in weight all material used and to provide a lighter construction throughout.

The cover 2 is preferably formed of aluminum alloy casting, or similar light material, such as a magnesium alloy and is provided with a flange member 17 which extends downwardly so as to have locking engagement with the top of the ring member 3. Thus, instead of having the ring member 3 of large complicated design, and extending upwardly around the top of the cartridge to engage the cover member, I have instead terminated the ring member 3 considerably short of the top of the cartridge and extended the cover member down into locking engagement with the ring. This permits a very simple construction and materially reduces the overall weight of the tank.

In Figure 2 the interlocking means between the cap 2 and ring 3 is by means of a Whitworth type of thread so that the threads may be cast on the ring member and on the cover member. The bottom edge of the flange 17 is preferably tapered so that when it contacts with the rubber gasket 18, the body of rubber will be forced inwardly to produce a tight friction joint. The top inner part of the cover 2 is so designed as to receive an annular cork gasket 19 adapted to contact with and cushion and steady the cartridge. A handle 20 is provided for easy handling of the entire tank in inserting and removing the same from the storage container, and is of a size to permit removal of the cover 2 from the ring 3.

In Figure 3 I have shown a modification of the handle structure wherein the cover casing is formed with a depression 21 so as to reduce the overall height of the tank and still give ample space between the handle 20 for the fingers. In Figure 4 I have illustrated a modified locking means between the cover and the ring wherein the top of the ring 3 is provided with a plurality of annularly spaced tapered cam members 22 as shown in dotted lines and the lower edge of the flange 17 is provided with lug members 23, the members 22 and 23 forming a bayonet joint. In the actual fabrication of tank units as shown in the drawings, the forming of such tank in only two units, the eliminating of all accessory members and the terminating of the ring 3 short of the cartridge, has made it possible to save approximately three and one-half pounds per tank. The actual storage space required for the tank designed as shown in Figure 2, effects a saving over standard storage tanks now in use of approximately 37%; in other words, 137 of the tanks disclosed in Figure 2 can be stored in the space required for 100 tanks of standard design.

In Figures 5 to 8, I have shown a slightly modified form of tank structure and at the same time I have shown the same adapted to a standard type ammunition having a cartridge case 6, a cap end 7 and a projectile 8a. The modification in Figure 6 differs from that shown in Figure 2 in that the top ring casting 3 is held in place by the extension 4a of the body member, instead of being welded to the body member. This method of securing the top ring to the body part of the tank is more or less common practice. The novelty in Figure 5 is the size, and the locating, of the ring just below the cap end of the cartridge. The outer upper end of the top ring 3 is provided with a flange 24 with spaced ring members 25 which cooperate with spaced projections 26 formed on the cap 2 to form a bayonet and slot connection. The ring member 3 in the form shown in Figure 6 is provided with a single annular groove 27, the purpose of which will be presently explained.

The bottom 5 of the tank is welded to the body portion 4 at point 13, similar to the arrangement shown in Figure 2. The shell is partially centered by the indentations 15 but in the special form of shell shown in Figure 6, I prefer to use a centering plate 28, held in place by suitably fabricating the bottom portion of the tank, this plate 28 having a tapered aperture portion for guiding and centering the projectile portion 8a of the shell. The bottom portion 5 is also formed with an outwardly flaring annular projection 29 so shaped as to fit within the groove 27 formed in an adjacent tank member; in other words, tank structures of the type shown in Figure 6 and also Figure 10 are adapted to be stacked with the cap ends reversed, thus making it possible to materially reduce the distance between the axes of adjacent tanks. The gasket or seal 18 is substantially identical with that shown in Figure 2, being contacted by the flanged lower end of the cap; the seal 18 is positioned somewhat higher relative to the top ring 3 than shown in Figure 2 but the seal is still positioned beneath the cap end of the shell and supported by a strong body portion of the top ring casting.

In the modification shown in Figure 7 the cap 2 is changed in that the inner surface thereof is formed by a stamped sheet metal unit 30. The casting which is formed around the sheet metal unit is adapted to move relative to the sheet metal unit 30, and inasmuch as the lower end

31 of the sheet metal unit is flanged to form a seat for the gasket 18, it will be seen that when the cap 2 is turned the lower end 31 of the sheet metal unit 30 will be forced against the gasket without moving laterally relative thereto.

Figure 8 is a further modification of cap structure wherein the top portion 32 of the cap is provided with the stud members 33 for receiving a bail 34, this construction making it possible to reduce the overall height of the tank or to allow more space within the cap to accommodate varying lengths of shells. It will be noted in the cap members shown in Figures 6, 7, and 8 that provision is made for accompanying the standard type of clip extractors such as shown in dash-dot lines at 35. The top gasket 19 is cut away to accommodate such clips. In other words, with my novel structure, it is possible for the operator to remove the cartridge directly by the use of his hands or standard extractor clips may be used.

In Figure 10 I have shown two tank structures of the general type illustrated in Figure 6, nested together; these tanks are substantially identical with the design shown in Figure 6 except that the bottom portions thereof are shaped to receive cartridge case ammunition 6 of the type illustrated in Figure 2. It will be seen from this disclosure that the bottom portions 5, as well as the body portions 4 may be varied considerably to adapt themselves to different shapes of ammunition. The cap 2 in the top tank shown in Figure 10 is modified slightly from the design shown in Figure 8 in that the bail 34 is positioned around the side of the cap member instead of being held in place by lugs formed on the top of the cap.

In Figure 11 I have illustrated in dot-dash lines the usual manner of stacking ammunition tanks. It will be seen from this illustration that tanks constructed in accordance with the present invention are of much smaller diameter, of less length, and of much less weight, than standard tanks; and particularly when in reversed nested position as shown in Figure 10, will require only a minimum amount of space as between the axes of adjacent tanks.

In Fig. 12 I have shown the type of tank illustrated in Fig. 6 in elevation and nested together in reversed end relationship and in Fig. 13 I have shown an end view of tanks stowed as shown in Figs. 10 and 12.

It will thus be seen that in the arrangement as shown in Figs. 10, 12 and 13, that tanks of the types shown in Figs. 6 and 10 may be stowed with the head ends and bottom ends of adjacent tanks reversed with respect to each other so that the larger head end is placed opposite the smaller bottom end. In this way advantage is taken of the fact that the ammunition is of smaller diameter at the bottom end of the tank. The center to center distance of adjacent tanks, such as shown in Fig. 10, is determined, not by the head end alone, but both the diameter of the head ends and the bottom ends; in other words, the center to center distance between adjacent tanks, of the reversed type such as shown in Figs. 6 and 10, is the sum of one-half the diameter of the head end and one-half the diameter of the bottom end. It will, therefore, be obvious that with the reversed arrangement as shown in Fig. 10, more tanks can be placed in a row for any given length of row and more rows may be stacked in any given height.

What I claim is:

1. A cartridge tank construction adapted to be stowed in as small a space as possible, comprising a main tank unit and a cover, the greater part of the wall of the tank unit being of substantially the same shape and size as the cartridge shell, said main tank unit terminating short of the cap end of the cartridge, the bottom portion of said tank unit having inwardly extending means formed as an integral part of the side wall of the tank for positioning and holding the inner end of the cartridge in a substantially fixed position within the tank.

2. A cartridge tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit and a cover, said main tank unit embodying a substantially cylindrical body portion, a bottom portion and a top portion, the inside diameter of a portion of the body portion being of substantially the same shape and size as the portion of the cartridge case located adjacent thereto, said main tank unit terminating short of the cap end of the cartridge to brace the tank adjacent said end and permit direct removal of the cartridge from the tank and annular reinforcing means formed adjacent the bottom portion and top portion of the tank and so positioned and shaped that when an adjacent tank of the same construction is stowed alongside thereof with its cover end reversed relative to the cover end of said first named tank, said annular reinforcing means will interlock to bear the load of the tanks and maintain the same in relative alignment.

3. A cartridge tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit and a cover, said main tank unit comprising a substantially cylindrical body portion, a bottom portion and a top portion, the inner diameter of the greater part of the tank unit including the top portion being of less diameter than the cap end of the cartridge case, said main tank unit terminating short of the cap end of the cartridge, and annular reinforcing means formed adjacent the bottom portion and top portion of the tank and so positioned and shaped that when an adjacent tank of the same construction is stowed alongside thereof with its cover end reversed relative to the cover end of said first named tank, said annular reinforcing means will interlock to bear the load of the tanks and maintain the same in relative alignment.

4. A cartridge tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit including a top ring and a body portion of less diameter than said ring, the greater part of the inner diameter of the tank unit being only slightly greater than the cartridge case, said main tank unit terminating short of the cap end of the cartridge, a groove formed in said top ring and a tongue formed adjacent the lower end of said body portion whereby any two tanks of the same construction may be stacked alongside each other with covers reversed and grooves and tongues registering to reduce the distance between their respective axes to minimum.

5. A cartridge tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit and a cover, said main tank unit comprising a substantially cylindrical body portion, a bottom portion and a top ring portion, the inside diameter of the greater part of the tank unit including the top ring being only slightly greater than the outer diameter of the cartridge case and less than the diameter of the cartridge cap, said main tank unit terminating short of the cap end of the cartridge, a groove

formed in said top ring and a tongue formed adjacent the lower end of said body member whereby any two tanks may be stacked alongside each other with covers reversed and thus reduce the distance between their respective axes to minimum.

6. A cartridge tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit formed of a bottom portion, a body portion and a top ring, a cover for said unit, said bottom portion being secured to said body portion, said top ring terminating short of the cap end of the cartridge and having locking means cooperating with locking means formed on the cover member, the main portion of said tank unit being of only slightly greater diameter than that of the cartridge case, and sealing means compressed between a portion of said cover and top ring and positioned closely adjacent the plane of the cap end of the cartridge, a groove formed as a part of the main tank unit adjacent the bottom portion of the top ring and a tongue formed adjacent the lower end of said body portion whereby any two tanks may be stacked alongside each other with covers reversed and thus reduce the distance between their respective axes to minimum.

7. An ammunition tank construction adapted to be stowed in as small a space as possible and comprising a main tank unit and a cover, a ring member positioned adjacent the top of the tank, said ring member being of greater diameter than a bottom portion of the tank and complemental and interlocking portions formed adjacent the top ring and said bottom portion of the tank and extending around the tank, said portions being so complementally formed that when adjacent tanks are stacked with their top ring ends and bottom ends reversed, the interlocking portion adjacent the bottom end of one tank will complementally fit relative to the interlocking portion adjacent the top ring of an adjacent tank.

8. An ammunition tank construction adapted to be stowed in as small a space as possible, comprising a main tank unit and a cover, the cover end of the tank being of greater diameter than a bottom portion of the tank and interlocking means formed as a part of said tank and so positioned and arranged that when an adjacent tank of the same construction is stacked with its cover end reversed relative to the cover end of said first named tank the interlocking means on one tank will complementally register with interlocking means on the reversed tank so that the distance between the respective axes of the tanks is reduced to a minimum.

9. A cartridge tank construction adapted to be stowed in as small a space as possible, comprising a main tank unit, said unit including a bottom portion, a body portion, and a reinforcing top ring unit, the greater portion of the inside surface of said body and bottom portions being of less diameter than the cap end of the cartridge, annular reinforcing means formed as a part of and located adjacent the bottom portion of the tank whereby to cooperate with similar reinforcing means of an adjacent tank stacked alongside of the first named tank, a cover member for the open end of the tank and having a portion extending past and overlapping a portion of said reinforcing ring unit and complementally fitting means formed as a part of the overlapping portions of said ring and cover tending to draw the cover into closed position on the tank when the cover is rotated about the axis of the tank.

10. A cartridge tank construction adapted to be stowed in as small a space as possible, comprising a main tank unit, said unit including a bottom portion, a body portion, and a reinforcing top ring unit, the inner wall of the tank adjacent said bottom portion, body portion and top ring being of less diameter than the cap end of the cartridge, annular reinforcing means formed as a part of and located adjacent the bottom portion of the tank whereby to cooperate with the reinforcing means of an adjacent tank stacked alongside of the first named tank, a cover member for the open end of the tank and having a portion extending past and overlapping a portion of said reinforcing ring unit and complementally fitting means formed as a part of the overlapping portions of said ring and cover tending to draw the cover into closed position on the tank when the cover is rotated about the axis of the tank, a portion of the side wall of said tank adjacent the bottom portion being inwardly embossed to form locating means for the inner end of the cartridge case.

11. An ammunition tank construction adapted to be stowed in as small a space as possible, comprising a bottom portion and a cover end of greater diameter than said bottom portion and adapted to receive a cover, said cover end including an annular reinforcing ring member and reversed end locating means, an annular reinforcing member formed adjacent said bottom portion of the tank, said bottom reinforcing member being so positioned and shaped that when a tank of the same construction is stowed with its cover end reversed relative to the cover end of said first named tank, a portion of said bottom reinforcing means will fit within the space between said cover end ring member and said reversed end locating means, whereby the distance between the respective axes of the tanks is reduced to a minimum.

12. An ammunition tank construction adapted to be stowed in as small a space as possible, comprising a bottom portion and a cover end of greater diameter than said bottom portion and adapted to receive a cover, said cover end including an annular reinforcing ring member and reversed end locating means, an annular reinforcing member formed adjacent said bottom portion of the tank, said bottom reinforcing member being so positioned and shaped that when a tank of the same construction is stowed with its cover end reversed relative to the cover end of said first named tank, a portion of said bottom reinforcing means will fit within the space between said cover end ring member and said reversed end locating means, whereby the distance betwen the respective axes of the tanks is reduced to a minimum, said bottom reinforcing means being formed as an integral part of the tank wall.

13. A cartridge tank construction adapted to be stowed in as small a space as possible, and comprising a main body portion of substantially the shape and size of the cartridge shell, reinforcing means at one end of the tank and defining the greater diameter of the tank, and interlocking means forming a part of said tank and so positioned and arranged that when an adjacent tank of the same construction is stacked with its reinforcing means reversed relative to the reinforcing means of said first named tank, said interlocking means will complementally register with means on the reversed tank to hold the tank against relative longitudinal movement.

14. A cartridge tank construction adapted to be stowed in as small a space as possible, and comprising a main body portion of substantially the

shape and size of the cartridge shell, reinforcing means at one end of the tank and defining the greater diameter of the tank, and interlocking means forming a part of said tank and so positioned and arranged that when an adjacent tank of the same construction is stacked with its reinforcing means reversed relative to the reinforcing means of said first named tank, said interlocking means will complementally register with means on the reversed tank to hold the tank against relative longitudinal movement and said reinforcing means of said respective tanks will register with parts of the other tank of less diameter whereby the distance between the respective axes of the tanks is less than the diameter of the reinforcing means.

15. A cartridge tank construction adapted to be stowed in as small a space as possible, and comprising a main body portion of substantially the shape and size of the cartridge shell, reinforcing means at one end of the tank and defining the greater diameter of the tank, and interlocking means forming a part of said tank and so positioned and arranged that when an adjacent tank of the same construction is stacked with its reinforcing means reversed relative to the reinforcing means of said first named tank, said interlocking means will complementally register with said reinforcing means to reduce the distance between the respective axes of the tanks to less than the diameter of the reinforcing means.

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