

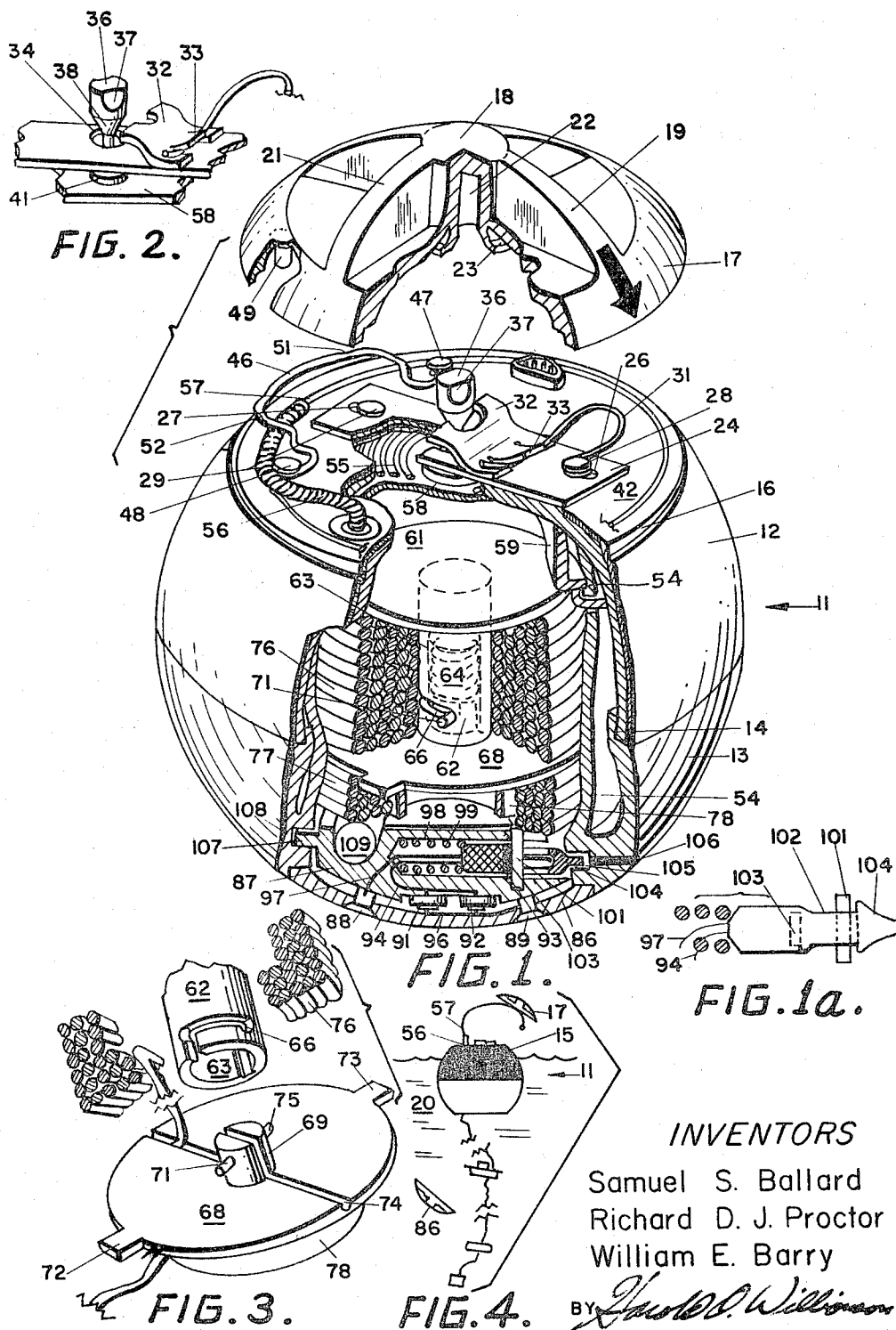
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SONOBUOY WITH DEPTH SELECTION CAPABILITIES

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**SONOBUOY WITH DEPTH SELECTION
CAPABILITIES**

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This invention relates to an improved air launched sonobuoy with antenna release, improved antenna power transmission and depth selection capabilities.

More particularly, this invention relates to a sphere shaped sonobuoy that may be launched from a high speed aircraft at great heights and which sonobuoy may be preset or reset by an elementary manual manipulation external of the buoy to provide for the depth at which a hydrophone array housed within the buoy will be suspended. In conjunction with the depth selection capabilities, there is provided simultaneously an antenna release which cooperates with an adjacent ground plane to provide highly efficient power transmission.

The prior art, while making in some instances a provision for depth selection, has contained a basic deficiency in that the depth selector is conventionally located within the environs of the sonobuoy's internal mechanisms and therefore not readily accessible for setting or altering the depth selection setting.

This above noted arrangement required the complete dismantling of the sonobuoy to effect a change. This in itself is time consuming. The situation is even further aggravated by the fact that the sonobuoys are to be launched from a high speed aircraft, which aircraft has a minimum of free space in which to store the sonobuoys and to make the depth selection adjustment. The selection of depth calls for a complete dismantling of the sonobuoy. It is therefore seen that the versatility of the prior art sonobuoys in these respects is severely limited.

The invention to be described hereafter completely overcomes all of these deficiencies in that the sonobuoy has a most compact sphere shaped configuration which lends itself to storage in a minimum of space. Precise depth selection settings may be accomplished externally of the sonobuoy's housing without the use of any tools and without the need to dismantle the sonobuoy.

Furthermore, there is provided as an integral part of a sphere shaped sonobuoy, a metallic coating to the upper half of the sphere shaped buoy which acts as a ground plane which is electrically continuous to the ocean's surface in all directions. This feature provides a highly improved transmission capability once the sonobuoy is in its ocean environment.

It is therefore an object of this invention to provide an air launched sonobuoy that may be manually externally set to release an electronic unit to a predetermined depth.

Another object of this invention is to provide an improved sonobuoy antenna release and antenna power transmission which utilizes a novel ground plane formed integrally as part of the sphere shaped buoy.

Still another object of this invention is the provision of a sonobuoy hydrophone release cap which utilizes salt water contact to activate a cap release mechanism.

Another object of this invention is the provision of an in-water stabilizer which also serves a dual function of being an external control for presetting or resetting the depth to which an electronic unit will be lowered.

Another object of this invention is the provision of a sonobuoy that will release its electronic units to be lowered into the ocean only when the sonobuoy enters the water while never releasing when accidentally dropped other than in the ocean.

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For a better understanding of the present invention together with other and further objects thereof, reference is made to the accompanying drawings and its scope will be pointed out in the appended claims.

In the drawings:

FIG. 1 is an exploded view of a sonobuoy embodying the invention;

FIG. 1a is a partial showing of an explosive squib;

FIG. 2 is a partial showing of a portion of a cable release drive train and its interrelation with an antenna releasing device;

FIG. 3 is a partial view of the cable release mechanism in detail; and

FIG. 4 is an illustration of a sonobuoy embodying the invention in a water environment.

Reference is now made to FIG. 1 in which there is depicted an exploded view of the spherical sonobuoy embodying the invention. The sphere shaped buoy generally designated at 11 is made up of an upper shell 12 which is firmly secured to a lower hemispherical shell 13, the shells meeting at a stepped overlapping junction 14. These upper and lower shells are bonded to each other at the stepped overlapping junction 14 by a suitable adhesive material not shown in the drawing. Both the upper and lower shells 12, 13 are of a premolded plastic material or other suitable material. At the top of the upper shell 12, there is a lip shaped groove 16 which cooperates with a stabilizing cap 17 when the stabilizing cap is placed down upon the upper surface 42 of the upper shell 12. The entire surface of the upper shell 12 has plated thereon, or suitably affixed by way of spraying or other painting techniques, a thin metallic ground plane 15 over the entire surface. The function of this metallic coating 15 and its cooperation with the power transmission of the sonobuoy will be described more fully hereafter.

The stabilizer cap 17 has a raised central portion 18 which has extending therefrom a plurality of stabilizing ribs 19 and 21. These stabilizing ribs 19 and 21 provide some in-flight stabilizing of the buoy after it has been launched from a high speed aircraft. The major function of the ribs 19 and 21 is to provide stability to the buoy immediately after water impact at which time the water rushes about and around the sphere shaped buoy and coacts with the ribs 19 and 21, and the buoy stabilizes itself in a direction relative to the water in such a manner that the bottom shell 13 of the buoy takes the brunt of the loading induced by the passage of the buoy through the water.

There will be seen in the raised central portion of the stabilizer cap 17 a slotted recess 22 which has at its base a projection retaining lip 23. Directly beneath the stabilizer cap 17, there is illustrated a spring biased latch plate 24 which has at either end thereof oval shaped pin slots 26 and 27. Passing through those pin slots 26 and 27 are retaining pins 28 and 29, which are securely fastened to the flat upper surface 42 of the upper shell 12. These slots 26 and 27 permit the spring biased latch plate 24 to slide through a limited travel dictated by the lengths of the slots 26 and 27.

The latch plate 24 receives its spring bias from a horseshoe spring 31 which has one end thereof securely fastened to pin 28, and the other end of the spring is attached to a fork shaped cap retaining member 32, which is secured to the latch plate 24 in a manner not shown, but any suitable brazing or riveting of this fork shaped cap retaining member will suffice. The fork shaped cap retaining member has a raised central tab 33. This raised central tab 33 cooperates with the horseshoe spring 31 to provide the spring bias to the latch plate 24 as can be seen in FIG. 1. Any movement of the latch plate 24 to the right would tend to compress the horseshoe spring 31

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and upon release of pressure, the spring 31 will cause the plate 24 to move to the left. The structural coaction just noted can best be seen by a study of FIG. 2 in which a few of the structural components are set forth and their mating relationship is more clearly illustrated therein.

Referring specifically to FIG. 2 at this time, there is seen a central circular opening 34 in the latch plate 24. Passing through this central circular opening cap 34 is a depth selection drive train stub 36 which has a flattened face 37. This cable release drive train stub 36 will, when the cap 17 is pressed down upon the top of the sphere shaped buoy 11, mate with the slotted recess 22 in the cap 17. At the base of the drive train stub 36, there is a cone shaped cam face 38 which will cooperate with the circular opening 34 in a manner to be described more fully hereafter.

As can be observed in FIG. 2, should the latch plate 24 be biased in a direction to the left as this figure is viewed in the drawings, the circular opening 34 would come in contact with the cam face 38 and should there be any vertical reciprocating motion of the drive train stub 36, the cam face 38 would coast with this circular opening. In the situation where the motion is downward, the latch plate 24 will be displaced to the right against the spring bias action of the horseshoe spring 31.

Referring back now to FIG. 1, it can be seen that when the fork shaped cap retaining member 32 is displaced to the right with the latch plate 24, the cap 17 could then be pressed down onto the upper surface 42 of the upper shell 12 and when this latch plate is free to move to the left, the fork shaped cap retaining member 32 will come into mating engagement with the projecting retaining lip 23 to securely hold the cap 17 in place.

Still referring to FIG. 1, there is shown a bent detent spring 46 which is secured to the upper surface 42 by rivets 47 and 48. Integral with the cap 17 is a downwardly projecting detent prong 49 which, when the cap is placed securely on the upper surface 42 of the sphere shaped buoy 11, cooperates with the detent spring at bends 52 and 51. These detent bends 51 and 52 have been pressed in the detent spring 46. Should the cap 17 be rotated, the detent prong 49 would ride over the surface of the detent spring 46 to either of the detent bends 51 and 52 in the spring and maintain the cap in either of these two positions due to the coaction of the prong 49, for example, with detent bend 52 of the detent spring 46.

Directly beneath the upper surface 42, there is formed a central cavity cup 54 which houses a cable release drive train to be described more fully hereafter. Looking now at FIG. 2 for a moment, it will be seen that the drive train stub 36 is securely fastened to a yoke plate 58 via a downwardly projecting cone shaped cam face 38. At the base of the drive stub 36, there is a grooved surface 41 which has mounted thereon a sealing ring (not shown) to seal the central cavity cup from the atmosphere above the upper surface 42. Referring back to FIG. 1, there is also shown mounted on the upper surface 42 an antenna erection spring 56 which passes through the upper surface 42 into the electronic components which are housed within the sphere shaped buoy. These electronic components have not been shown in these drawings but are fitted between the walls of the central cavity shell 54 and the upper and lower shells 12 and 13, respectively. Affixed to the end of the antenna erection spring 56 is a coiled antenna 57 which, when the cap 17 is released in a manner to be described hereafter, will spring into erect position to permit the transmission of information.

A yoke plate 58 is securely affixed to the drive stub 36 and has a downwardly projecting leg 59 which is securely fastened to a deep cable supply plate 61. This deep cable supply plate 61 has securely fastened at its center a drive shaft 62, which drive shaft 62 has at its lower end a bored opening 63 (see FIG. 3); which bored opening receives a compression spring 64 whose function

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will be more fully appreciated as a further description of the device is made.

At the base of the drive shaft 62, there is a cam slot 66. Directly beneath the drive shaft 62 is a release plate 68 which has centrally disposed thereon, as best seen in FIG. 3, a stub 69 which has passing therethrough cam pins 71 and 75. The cam pin 71 and related stub 69 cooperate with the slotted opening in the drive shaft 62 to fit at either of two positions.

Referring to FIG. 1, the stub 69 with its cam pin 71 has been inserted into the drive shaft 62 and rotated relative to the shaft 62 to the end of possible travel of the cam slot 66. This position relates to a condition to be described later as the shallow release of cable which is one of the prime functions of the invention.

The release plate 68 has at its periphery locking tabs 72 and 73 which cooperate with grooves (not shown) in the central cavity cup 54 to hold the release plate 68 from rotary motion relative to the drive shaft 62 and the deep cable supply plate 61 to which the drive shaft is securely fixed. On the face of the release plate 68 there is a groove 74 which functions as a protective slot for portions of the cable supply to reside in, and its function will be described more fully hereafter. There is seen coiled between the deep cable supply plate 61 and the release plate 68 a deep cable supply 76. Directly beneath the release plate 68, there is a second supply of cable referred to hereafter as the shallow cable supply 77. The cable supply 77 and the cable supply 76 are interconnected by a portion of the cable, as best can be seen by a study of FIG. 3, where the cable supply 76 is shown with a portion thereof passing into the groove 74 around and underneath the plate 68 and passing off to the left at the bottom of the plate 68. There is formed integrally on the plate's 68 bottom a shallow cable supply hub 78 which also houses a weight (not shown) which is connected in series to the cable and to a hydrophone 109, part of a hydrophone's array (not shown), which is to be lowered to the depths of the water in a manner to be described hereafter.

Directly above the deep cable supply plate 61 and beneath the yoke plate 58 there is shown an opening or an empty space, as seen in FIG. 1. This space is normally occupied by a battery which is activated by salt water upon contact with the water. The battery (which is not shown) has its own suspension cable which will permit it, when the buoy strikes the water and the release drive train passes through the bottom of the buoy in a manner to be described hereafter, to be suspended beneath the buoy and upon salt water contact, produce the power to activate the electronics located within the buoy 11 as noted above.

At the base of the lower shell 13, there is a bottom release cap 86 whose function is to hold the cable supply 76 and 77 and the related hydrophone 109 in place until the buoy 11, which has been launched from an aircraft, has struck the water. This bottom release cap 86 has securely fastened thereto an explosive squib holding block 87 which is secured to the bottom release cap 86 by electrical contact screws 88 and 89. Located between the bottom release cap 86 and the squib holding block 87 are a plurality of mercury cell batteries 91 and 92 which form a power supply to activate the explosive squib in squib holding block 87. In the embodiment shown in FIG. 1, there are depicted two such mercury cells; in actual practice, as many as four may be needed, depending on the amount of power required to activate the squib. Secured within the squib holding block 87 is an explosive squib 93 which can be seen mounted within a squib holding bore 98. The squib holding bore 98 has fitted therein a coiled compression spring 99 which acts to hold the explosive squib 93 in a position to the right as viewed in FIG. 1.

Reference now to FIG. 1a should better clarify the structural configuration of explosive squib 93 and its co-

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action with a guide pin 101 which passes through a slot 102 in the squib body 93. Studying FIG. 1a, it will be seen that two electrical lead wires 97 and 94 pass from one end of the explosive squib 93. The explosive squib 93, being fitted in the squib holding bore 98, may slide either to the right or left as viewed in FIG. 1 against the coiled compression spring 99 which has been fitted into the bore prior to the insertion of the explosive squib 93. Once the explosive squib 93 has been placed in the bore 98, the squib retaining guide pin 101 is slid through the slot 102 and securely fastened in the squib holding block 87. The right hand end of this explosive squib 93 has a release pin 104 which is shown in FIG. 1 in mating engagement with a release pin opening 105 found in the lower shell 13 of the buoy 11.

There is also depicted immediately adjacent the release pin opening 105 a solid black element which is in fact a rubber water sealing material 106 which has been inserted into that portion of the lower shell to prevent the moisture from entering the inner shell cavity 54 during storage. At the opposite end of the squib holding block 87, there is shown integrally formed thereon a hinged pin 107 which is in mating engagement with a hinged pin opening 108. The operation of this squib 93 and its coaction with the compression spring 99 will now be described. As can be seen, the explosive squib 93 has integrally connected thereto an electric wire 97 which in turn is securely fastened to electric contact screw 88. There is a second wire 94 which also passes out of the explosive squib 93 and connects in series, as shown in FIG. 1, the mercury cell batteries 91 and 92 with the electric contact screw 89 via electrical wire 96.

In the embodiment disclosed herewith, the electrical contact screws 88 and 89 are of dissimilar metals, such as silver and magnesium, having different values in the electromotive force series and therefore, since they are of different valence values, when these two electrical contact screws 88 and 89 are placed in a saline or electrolytic environment such as constituted by the ocean, there exists between them, because of their relative valence values in the electromotive series, a potential. This potential enhances the transmission of electrical energy between the screws 88 and 89, thereby further insuring the closing of this series loop comprised of the wire 97, the squib 93 and the two mercury cell batteries 91 and 92. As can be seen, this arrangement provides for an electrical connection between the screws 88 and 89 only when the entire buoy has been submerged in electrolytic solution, or in other words, the ocean. The screws 88 and 89, while depicted as being mounted flush with the lower surface of the bottom release cap 86, may in fact be to some degree depressed within the bottom release cap 86 to minimize the possibility of inadvertent electrical connection between the two electric contact screws 88 and 89.

Operation of bottom release

The operation of the device is as follows, that is, with respect to the explosive squib and its release action upon water impact.

As the buoy strikes the water, there is an electrical contact made between the electrical end terminal contact screws 88 and 89 which closes the circuit and fires the explosive squib 93. Because the explosive squib 93 has been spring biased by compression spring 99 against the guide pin 101 which is secured in the squib holding block 98, there is but one direction in which the explosive force of the squib 93 may travel and that is, viewing FIG. 1, to the left against the compression force of the spring 99. Movement to the left, of course, will cause the integrally connected release pin 104 to move with the body of the explosive squib 93 to the left and in so doing, the release pin 104 leaves the mating engagement of the release pin opening 105.

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Reference is now made to the upper portion of the upper shell 12 in which there is seen a conically coiled ejector spring 55 mounted between the yoke plate 58 and the flat upper surface 42 of the upper shell 12. Upon water contact and the release of the release pin 104 from its mating engagement with the release pin opening 105, the spring 55 exerts a force on the yoke plate 58. There exists on the entire unit housed within the central supply cavity 54 a force which tends to push downwardly the end cap 86 and its related squib holding block 87 out of the bottom of the buoy in a manner schematically shown in FIG. 4. The squib block has a portion, noted above as a hinge pin 107, which pivots as the entire contents of the central cavity opening 54 pass through the bottom of the lower shell 13 of the sphere shaped buoy 11.

Operation of depth selection mechanism

Now the entire operation of this buoy may be explained starting with the presetting of the buoy to permit the selection of depth at either a deep or shallow depth depending on the use required of the buoy. The stabilizer cap 17 with its ribs 21 and 19 may be manually turned by the insertion of the operator's finger into the ribbed sections 19 and 21 and turned either in two positions. If the flight stabilizing cap 17 is rotated from its position as depicted in FIG. 1 in a clockwise direction, the detent prong 49 will ride over the surface of the bent detent spring 46 and come to rest in detent prong bend 51. Simultaneously with this rotary motion, there will be transmitted to the drive train stub 36 because of its co-operation with the slotted opening 22, a similar rotary movement which rotary movement will be translated directly through the drive train stub 36 to the yoke plate 58 and thence to the downwardly projecting lugs 59 which are secured to the deep cable supply plate 61, which in turn because of its secured relationship to the drive shaft 62, will cause the drive shaft 62 to move in a clockwise direction precisely the same as the direction in which the cap had been rotated.

Since the release plate 68 with its related locking tabs 72 and 73 is fixed against rotary movement, the relative movement of the drive shaft 62 with respect to the centrally disposed stub 69 and its related cam pin 71 will cause the pin 71 to ride along the cam slots opening 66 to a position at which its travel can no further continue. As best seen in FIG. 3, the release plate 68 may fall free from the drive shaft 62 and the pin 71 and the related stub 69 can pass downwardly and away from the drive shaft 62 and the deep cable supply 76 which is secured around the drive shaft 62. The falling away of the release plate 68 is enhanced not only by the weight of the release plate 68 and the related hydrophone and shallow cable supply 77 which are serially connected to the deep suspension cable supply 76, but also by the spring 64 which is shown mounted in a bored opening in the drive shaft 62.

The above turning of the cap 17 has therefore set the buoy to release all the cable contained within the cavity cup 54 and the maximum depth will be attained by the hydrophone 109 which is, of course, connected to the shallow cable supply 77 and the deep cable supply 76, which in turn is connected to and through the cavity shell 54 which has a water seal (not shown) in the upper right hand corner for connection to a transmitter which will thence, via the antenna 57, permit the transmission of information regarding the objects beneath the ocean which are desired to be studied.

As can be seen, this structural arrangement allows the buoy to be left preset at a shallow depth selection at which the flight stabilizing cap 17 is not rotated at all. This of course will permit only the freeing of the shallow cable supply 77 which has a decided advantage that should the field requirements be such that a deep depth selection be

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made, the entire depth selection may be changed from that of shallow to deep in the manner described above. Simultaneously with the release of the bottom cap 86 and either the deep or shallow cable supply 76 or 77, respectively, the yoke plate 58 will also pass out through the bottom of the buoy 11 because of its integral attachment to the deep cable supply plate 61. As the yoke plate and related depth selection apparatus pass downwardly, the cone shaped cam surface 38 of the drive stub 36 coacts with the central circular opening 34 as best seen in FIG. 2 to cam the spring biased latch plate 24 to the right as viewed in both FIGS. 1 and 2. In camming the spring biased latch plate 24 to the right, the fork shaped cap retaining member 32 is also translated to the right and in so doing, it releases its mating engagement with the projecting retaining lip which is an integral portion of the raised central portion 18 of the cap 17. Once this is accomplished, there is no physical means securing the cap 17 to the upper surface 42 of the buoy 11 and the spring action of the antenna 57 will cause the cap 17 to be ejected from the surface 42 of the buoy and permit a subsequent antenna erection due to the spring action inherent in the antenna erecting spring 48.

Once the above cap release has been accomplished and the antenna 57 stands erect much in the manner set forth in FIG. 4, the entire sonobuoy is now ready to operate in its new environment, that is, the ocean. At this point, the role of the metallic ground plane coating 15 described above comes into play, and we can see by a study of FIG. 4 that the spherically shaped buoy 11 rests in the water with a point of buoyancy considerably above the mid-section of the center line of the buoy 11. It is of importance that the ground plane afforded by the ocean's surface surrounding the buoy be continuous right up to the base of the antenna 57 in order that maximum power transmission be accomplished.

FIG. 4 represents a buoy just after it has struck the water and schematically sets forth the antenna 57 in a partially erected condition with the cap 17 in the process of being ejected. Directly beneath the buoy 11 is seen the release cap 86 falling away from the underside of the buoy, and the ocean 20 is in intimate contact with the metallic ground plane coating 15 which covers the entire upper surface of the buoy 11. This entire coating permits the buoy to rock, float, and bob, depending on the wind and the wave action impressed on it due to the weather surrounding the scene at which the buoy has been dropped and always maintain a continuous ground plane. The transmissibility of information from the ocean's depths is greatly enhanced by the presence of the electrically conductive surface material 15.

While there has been hereinbefore described what are at present considered preferred embodiments of the invention, it will be apparent that many and various changes and modifications may be made with respect to the embodiment illustrated, without departing from the spirit of the invention. It will be understood that all changes and modifications as fall fairly within the scope of the present invention, as defined in the appended claims, are to be considered as part of the present invention.

What is claimed is:

1. An air launched sonobuoy with antenna release and hydrophone depth selection capabilities comprised of:

- (A) a releasable antenna cover plate having a recess opening therein,
- (B) a cable release drive train having a portion thereof in mating driving engagement with said antenna cover plate recess opening, said drive train being discharged from said sonobuoy upon water impact,
- (C) a suspension cable supply divided into a separated first and second unit of predetermined lengths,
- (D) said individual units being interconnected by an intermediate portion of said suspension cable, and
- (E) a release mechanism forming an integral portion of said cable release drive train, said release mechanism

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being movable between a first and second position to thereby control the release of said first and second suspension supply cable units.

2. The combination set forth in claim 1 wherein said releasable antenna cover plate is movable to a first and second setting which correspond respectively to said first and second cable release mechanism positions to thereby provide a direct and positive arrangement to set said release mechanism.

3. The combination set forth in claim 2 where there is provided a detent means for maintaining said releasable antenna cover plate in said first or second setting.

4. The combination set forth in claim 3 wherein said releasable antenna cover plate is releasably secured to a floatable sphere shaped sonobuoy housing.

5. The combination set forth in claim 4 wherein there is provided an antenna cover plate catch with which a portion of said cable release drive train cooperates to free said antenna cover plate when said drive train is freed for movement upon water impact.

6. The combination set forth in claim 4 wherein said sonobuoy has an antenna secured between said antenna release cap and said sphere shaped sonobuoy housing, and said sphere shaped sonobuoy housing has an electrically conductive surface adjacent to said antenna and extending over said sonobuoy's spherical contour at least to a point where said floatable sphere shaped sonobuoy housing has its water line after said sonobuoy has entered said water and is floating thereon to thereby provide for said antenna a continuous reflective ground plate contiguous to said antenna.

7. The combination set forth in claim 4 wherein said floatable sphere shaped housing has a bottom release cap to retain said drive train and related cable supply until water impact, and said bottom release cap has a force motor release means which is activated upon water contact.

8. The combination set forth in claim 7 wherein said force motor has an explosive squib,

- (A) said explosive squib being part of an open circuit connected thereto in series to a power supply, and
- (B) said open circuit having two end terminals spaced apart that electrically interconnect upon water contact to close said open circuit.

9. The combination set forth in claim 8 wherein said end terminals are composed of different metals in the electromotive force series to thereby provide a constant difference in potential between said end terminals whereby the closing of said open circuit is enhanced when said sphere shaped sonobuoy is in water contact.

10. An air launched sonobuoy with antenna release and hydrophone depth selection capabilities comprised of:

- (A) a releasable antenna cover plate having a recess opening therein,
- (B) a cable release drive train having a portion thereof in mating driving engagement with said antenna cover plate recess opening, said drive train being discharged from said sonobuoy upon water impact,
- (C) a release mechanism forming an integral portion of said cable release drive train, said release mechanism being movable between a first and second position,
- (D) a suspension cable supply divided into a separated first and second unit of predetermined lengths and having an intermediate portion of said cable supply interconnecting said first and said second units,
- (E) said releasable antenna cover plate being movable to a first and second setting which correspond respectively to said first and said second cable release positions to thereby provide a direct and positive arrangement to set said release mechanism to thereby control the release of said first and said second suspension supply cable units.

11. An air launched floatable sphere shaped sonobuoy

housing that has antenna release and hydrophone depth selection capabilities comprised of:

- (A) a releasable antenna cover plate having a recess opening therein and an antenna secured to said sphere shaped sonobuoy housing between said cap and said sphere shaped sonobuoy, 5
- (B) said sphere shaped sonobuoy having an electrically conductive surface adjacent to said antenna and extending over said sonobuoy's spherical contour at least to a point where said floatable sphere shaped buoy has its water line after said sonobuoy has entered said water and is floating thereon to thereby provide for said antenna a continuous reflective ground plane contiguous to said antenna, 10
- (C) a cable release drive train having a portion thereof in mating driving engagement with said antenna cover plate recess opening, said drive train being discharged from said sonobuoy upon water impact to thereby allow the release of said cap and said antenna, 15
- (D) a release mechanism forming an integral portion of said cable release drive train, said release mechanism being movable between a first and second position, 20
- (E) a suspension cable supply divided into a separated 25

first and second unit of predetermined lengths and having an intermediate portion of said cable supply interconnecting said first and said second units,

- (F) said releasable antenna cover plate being movable to a first and second setting which correspond respectively to said first and said second cable release positions to thereby provide a direct and positive arrangement to set said release mechanism to thereby control the release of said first and said second suspension supply cable units.

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