April 28, 1925. 1,535,633

E. A. SPERRY

SUBMARINE CONTACT MINE

Filed Nov. 8, 1917 3 Sheets-Sheet 1

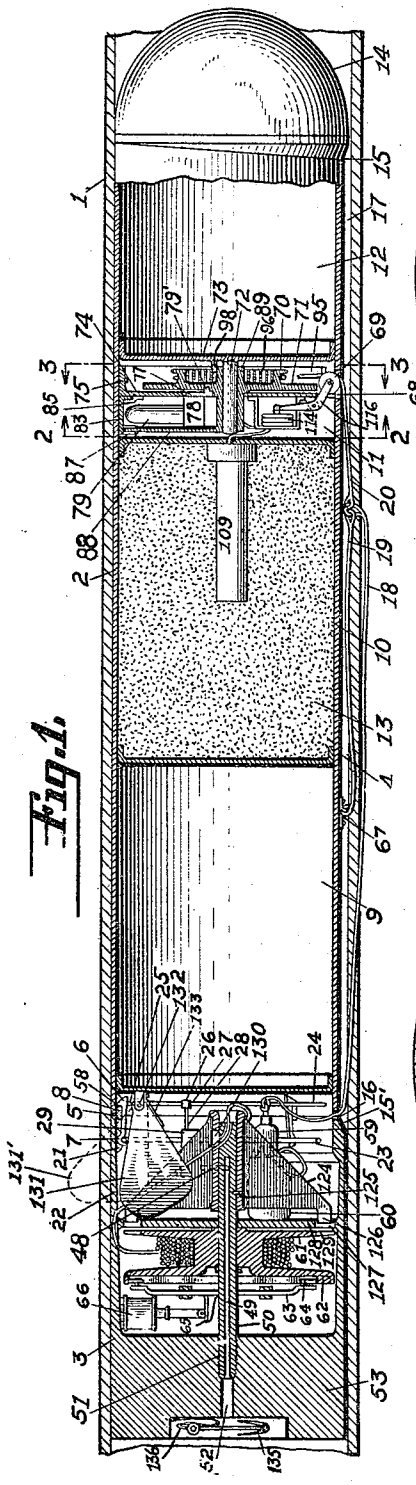


Fig. 1.

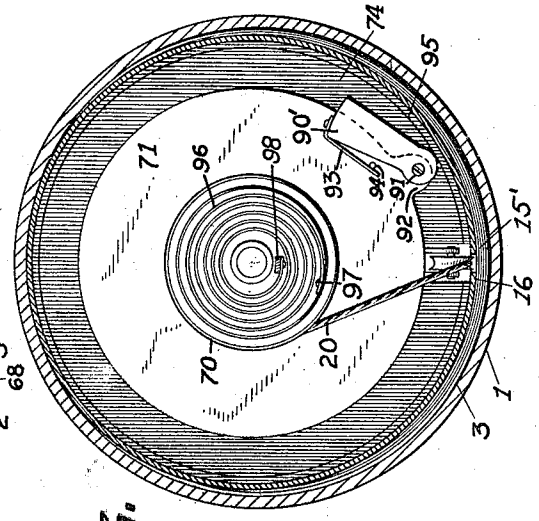


Fig. 3.

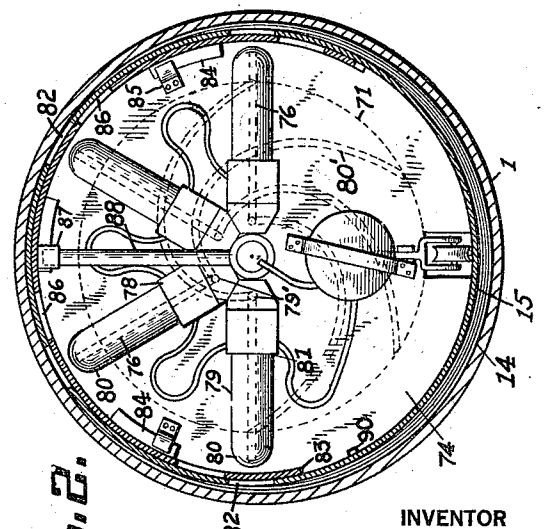


Fig. 2.

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Fig. 4.

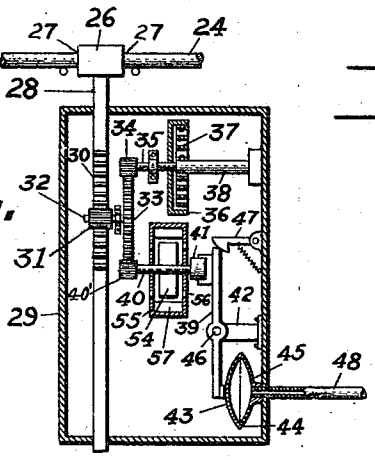


Fig. 5.

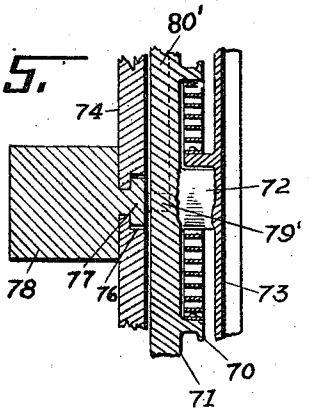


Fig. 6.

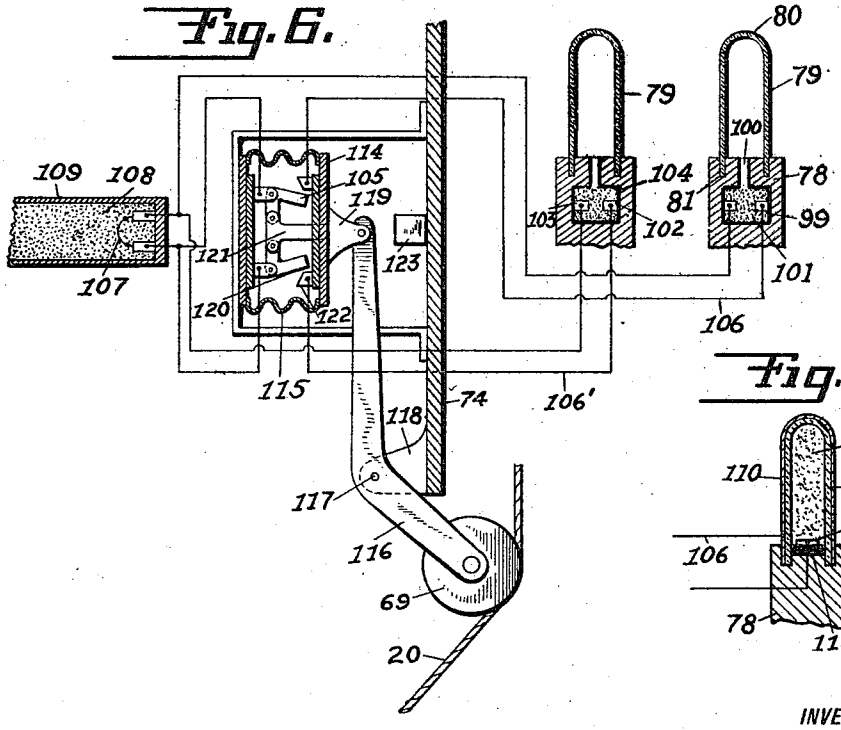


Fig. 10

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Fig. 8.

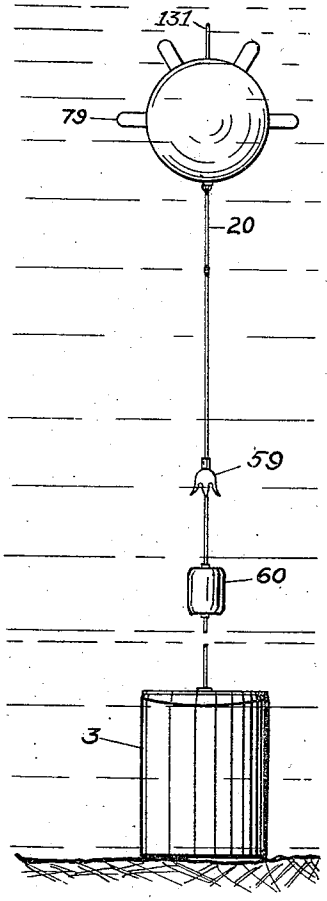


Fig. 7.

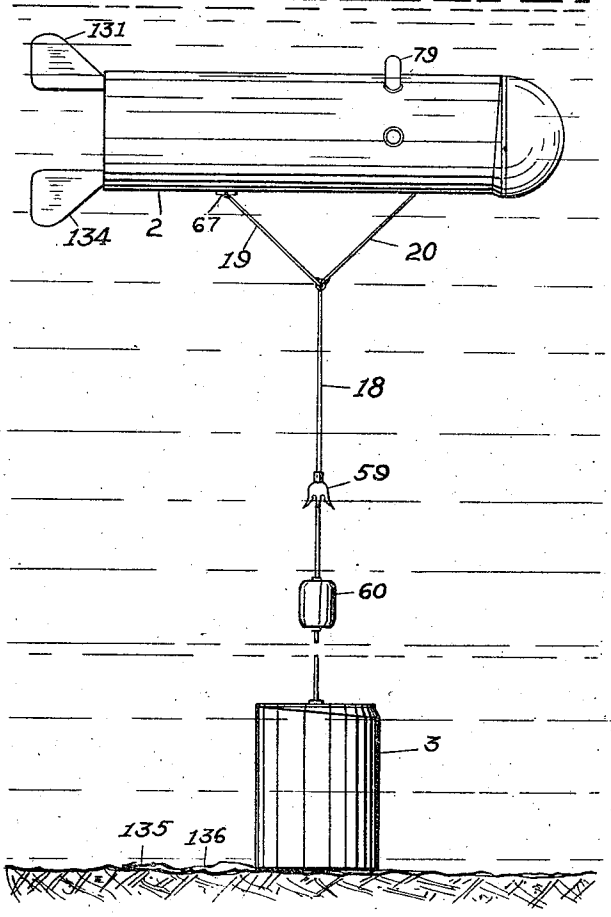
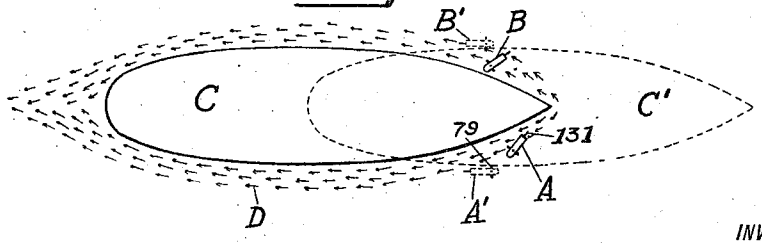


Fig. 9.



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Patented Apr. 28, 1925. 1,535,633

UNITED STATES PATENT OFFICE.

ELMER A. SPERRY, OF BROOKLYN, NEW YORK.

SUBMARINE CONTACT MINE.

Application filed November 8, 1917. Serial No. 200,860.

To all whom it may concern:

Be it known that I, ELMER A. SPERRY, a citizen of the United States of America, residing at 1505 Albemarle Road, Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Submarine Contact Mines, of which the following is a specification.

This invention relates to submarine mines adapted to be laid from submarine boats when in a submerged position.

Such mines are at present laid from specially constructed submarine boats. The object of the invention is to provide a mine which may be laid from ordinary submarine boats, thus obviating the necessity of building special boats for this work. The mine is designed to be placed in an ordinary submarine torpedo tube without making any alterations in the tube, to be ejected from said tube in the same manner in which torpedoes are ejected, and to thereupon anchor itself and assume a position a predetermined distance below the surface of the water without regard to the depth of the water in which it is launched. The method of launching and certain details of construction are similar to the mine disclosed in my copending application on submarine mines, which has now matured into Patent No. 1,506,784 dated September 2, 1924.

Referring to the drawings wherein I have shown what I now consider to be the preferred form of my invention:

Fig. 1 is a sectional side elevation of the assembled mine.

Fig. 2 is a sectional view of the mine taken on line 2—2, Fig. 1.

Fig. 3 is a section taken on line 3—3, Fig. 1.

Fig. 4 is a detail of mechanism for releasing the mine from its rigid attachment to the anchor after launching.

Fig. 5 is a detail of mechanism for arming the mine.

Fig. 6 is a sectional detail and wiring diagram of the exploding means.

Fig. 7 is a side elevation of the mine in the act of being automatically moored.

Fig. 8 is an end elevation thereof.

Fig. 9 illustrates the probable action of the currents along the sides of the ship upon the mine.

Fig. 10 is a modification of the exploding means.

In Fig. 1, a portion of a torpedo tube is represented at 1, within which is shown a mine 2, comprising an anchor portion 3 and a buoyant portion 4. The two portions are detachably secured together at 5 by means of latches 6, pivotally secured at 7 to said anchor portion, and engaging a lug 8 on said buoyant portion. The buoyant portion is shown as divided into four compartments, 9, 10, 11 and 12. Compartment 10 may contain the explosive charge 13: compartment 11 may contain the mechanism, which will be hereinafter described for firing said explosive 13, while compartments 9 and 12 are shown as air-tight chambers for imparting buoyancy to said explosive and firing mechanism.

The head 14 of the buoyant portion 4, is shown as having a diameter substantially equal to the interior diameter of the torpedo tube 1, while the remainder of said portion as shown beginning at 15 is smaller than said interior diameter of tube 1. The anchor portion 3 is also shown as having a diameter substantially equal to the inside diameter of the tube, and receding at 15′ to conform to the smaller diameter of buoyant portion 2 at the point of juncture 16. This arrangement as will be seen, provides a recess 17 between one side of the outside of portion 4 and the inside of tube 1, for the purpose of permitting cables 18, 19 and 20 to lie against the outside of the mine when in the torpedo tube. For the purpose of clearly showing the relationship of these cables, I have shown them hanging loosely instead of being drawn tightly against the mine.

Hooks 6 which hold the anchor and buoyant portions in locked relation, are shown as pivotally fitting into notches in projections 21 integral with the walls 22 of the anchor, and may be held in place by a ring 23 pressing said hooks into said notches. The said hooks are held in locked engagement with lugs 8 by means of a collapsible ring 24 pressing outwardly against said hooks at 25, and held in an expanded posi-

tion by a block 26 placed between the ends 27 of said ring (Fig. 4).

Provision may be made for withdrawing block 26 automatically after the mine has been launched, so as to allow ring 24 to collapse and permit hooks 6 to disengage lugs 8, to cause the separation of the two portions of the mine. For this purpose a rod 28 attached to block 26 is shown passing into a box or framework 29. This rod may be provided with gear teeth 30, meshing with a pinion 31 on the same shaft 32 with gear 33. A pinion 34 meshing with gear 33, is shown on a shaft 35 to which is fixed a member 36. Shaft 35 may fit revolubly at one end into a sleeve 38. A coil spring 37 fixed at one end to member 36 and at the other to sleeve 38 which is rigidly fastened to framework 29, tends to rotate member 36, and through the gearing, withdraw block 26. The gearing, however, is held normally against rotation by a key 39 which fits into a slot in the end of a shaft 40, or a terminal 41 fixed on said shaft, which shaft in turn has fixed thereon a pinion 40′ meshing with gear 33. Key 39 is shown pivoted at 46 to a projection 42 on framework 29, and fastened at one end by solder or otherwise to one wall 43 of a resilient chamber 44. The other wall 45 of said chamber is secured preferably to framework 29 so that expansion of the chamber can only take place against key 39, thus causing said key to turn on pivot 46 and be withdrawn from terminal 41 to allow the gearing to operate to withdraw block 26. A latch 47 may be provided to hold key 39 out of engagement with terminal 41. A tube 48 is shown communicating at one end with the interior of chamber 44 and at the other with a channel 49 in a shaft 50 (Fig. 1) fixed at 51 in the bottom of the anchor portion 3. A hole 52 in the bottom 53 of the anchor provides an opening from without the bottom of the anchor to channel 49.

When the mine is discharged from the submerged torpedo tube by compressed air in the manner in which torpedoes are usually discharged from submarine vessels, the air pressure passes through channel 49 and tube 48 into chamber 44, causing said chamber to expand and unlock the gearing in framework 29 as explained, so that said gearing may begin to operate. To retard the operation of the gearing, so that block 26 will not be completely withdrawn until the expiration of a predetermined length of time after the mine is launched, I have shown governor or fan blades 54 on shaft 40. As the joining between the anchor and buoyant portions is not designed to be watertight, it will be seen that as soon as the mine is launched water will enter the anchor portion and soon envelope the fan 54 and reduce its speed of rotation. In order to prevent the water adjacent the fan from whirling with it, thereby lessening its retarding action, I have shown fan 54 within a box or the like 55 having holes 56 to admit water thereto, and provided with baffle plates 57 therein, to prevent the water from whirling with the fan.

Thus it will be seen that considerable time may elapse after the launching of the mine, before the separation of the two portions takes place, the time being dependent largely upon the gear ratios employed in frame 29.

The anchor portion is designed with sufficient weight to cause the unitary structure to sink when it is launched, and the buoyant end will of course be uppermost, so that if the mine touches the bottom of the sea before the separation of the parts takes place, it will stand end up.

As soon as block 26 has been withdrawn, allowing ring 24 to collapse, latches 6 which engages lugs 8 at 58 on a bias, are forced out of engagement with said lugs by the upward force of the buoyant portion of the mine, so that said buoyant portion becomes detached from the anchor portion and begins to rise.

As the buoyant portion rises, it carries with it a coupling 59 and a weight 60, (see also Figs. 7 and 8), attached to cable 18. As soon as cable 18 is pulled taut it begins to reel off from a drum 61 into and out through the top of shaft 50. Drum 61 is mounted for turning on shaft 50 and is provided with a cam like flange 62, similar to that shown in my copending application above referred to, adapted to reciprocate arm 63 carrying rollers 64 engaging said cam. Arm 63 is connected by member 65 to the plunger of a dash pot 66 to retard the rate at which cable 18 feeds off from drum 61, thus reducing to a slow speed the rate of rising of the buoyant portion 2 of the mine.

Cable 18 is shown fastened to cables 19 and 20. Cable 19 may be fastened at one end to the mine at 67, while cable 20 may pass through an opening 68 in the side of the mine, over a pulley wheel 69, and terminate on a drum 70 after passing part way therearound. Drum 70 is shown as integral with a disk or plate 71, which is in turn integral with a hub member 89 on a shaft 72 projecting from partition plate 73.

Adjacent disk 71 and preferably in a plane parallel thereto, is a plate 74 fastened to the shell of the mine at 75. Guide slots 76 (see also Figs. 2 and 5) running from near the center of plate 74 toward the outer edge thereof, are adapted to carry a guide projection 77 on a block 78. A pin 79′ is shown protruding from guide projection 77 into a curved groove 80′ in disk 71. The effect of the rotating of disk 71 is to move block 78 along slot 76 away from the center of plate 74. A fragile, tube-like container 79 preferably made of a glass tube, closed

at one end 80 and open at the other end 81 (see also Fig. 6) is shown as embedded at said open end in or otherwise secured to block 78; the joining between the tube and block being designed to be watertight. Openings 82 in the side of the mine are provided for tubes 79 to project without the mine as shown in Figs. 7 and 8, when block 78 moves outwardly from the center of plate 74.

To protect tubes 79 from accidental breakage while the mine is on shipboard, or at any time before the tubes are caused to project from the mine, I close the openings 82, and have them open automatically after the mine has been launched and preferably at the moment that the glass tubes are projected from the mine. For this purpose, I have shown a curved strip 83, (Figs. 1 and 2) resting against the inside of the mine and passing across openings 82. Strip 83 may be provided with flanges 84, resting against plate 74 and slidably held in place by clips 85. Openings 86 are provided in strip 83, to be moved opposite openings 82 to permit the glass tubes to project through. Projections 87 similar to knife switch receptacles are shown on strip 83, to receive an arm 88 shown as integral with hub portion 89, so that the turning of disk 71 will cause arm 88 to turn also, carrying with it strip 83 until the said strip strikes a stop 90 at which point openings 86 are designed to lie opposite openings 82. Arm 88 will then lose its frictional engagement with projections 87, and pass on as disk 71 continues to turn, causing tubes 79 to move out through the openings.

It will be seen from the foregoing description that when the buoyant portion of the mine exerts a pull upon cables 18, 19 and 20, cable 20 will be pulled down as shown in Fig. 7, causing drum 70 on disk 71 to rotate and cause the tubes 79 to project out from the mine.

In order to govern the speed of rotation of disk 71, so as not to destroy any of the parts, I have shown a brake 90′, eccentrically pivoted at 91 on a projection 92 on said disk 71. The brake is shown as held in an inoperative position by a spring 93 fastened at one end to the brake, and pressing against a pin 94 in disk 71. When the speed of rotation of said disk exceeds a predetermined rate, centrifugal force causes the brake to overcome the pressure of spring 93 and to rotate on its pivot and press against the flange 95 of plate 74.

In order to return the tubes 79 to their inoperative position within the mine when the pull of cable 18 ceases, I may employ some means, shown here in the form of a flat spring 96 coiled within drum 70, and fastened at one end 97 to said drum and at the other end to a projection 98 on partition 73. The said spring is provided with tension opposing the pull of cable 20, so as to turn the mechanism back when said cable 20 ceases to pull. In turning back, arm 88 will again engage projections 87 and move strip 83 to close ports or openings 82.

In Fig. 6, blocks 78 are shown as having recesses 99 communicating with the interior of glass tubes 79 by means of ducts 100. The said recesses may contain a substance 101 which, upon the admission of sea water will quickly set up electro-chemical action between battery plates 102 and 103 shown as attached to insulating walls 104 in said recesses, which when switches 105 are closed, will cause a current to pass through wires 106. In the circuit 106 is shown a section of high resistance wire or filament 107 in the detonating or primary charge 108 in casing 109. The passing of the current through filament 107 is designed to cause an explosion of the detonating charge, and in turn the main charge 13 of the mine.

Fig. 10 illustrates a modified form of battery construction. In this form tube 79 may be enveloped in a thin casing 110, comprising preferably zinc, while a copper or other positive plate 111, may be mounted on insulation 112 within tube 79. The said tube may contain a complete rapid acting battery solution 113 which, when the glass is broken will act upon the zinc casing 110 and produce a current in filament 107. The covering 110 and plate 111 will thus form the two plates or electrodes of the cell; the glass 79 preventing electrolytic action until broken. The device may be so made that when a ship strikes the outer or metallic casing 110 it will cause breakage of the inner or glass lining 79 without destroying said outer casing.

In order to insure the explosion of the mine in the event that the wires 106 from the battery in one of tubes 79 are broken or one of switches 105 fails to make a good contact, the battery in the adjacent tube 79 may be provided with a completely separate set of wires 106′ having a separate switch 105.

I desire to render the mine safe from explosion under all conditions when it is not moored for action. It is for this purpose that switches 105 are provided. These switches are shown within an expansive chamber 114, for protection against the action of water. The resilient walls 115 of said chamber are designed to maintain the said chamber in the position shown in Fig. 6, with switches 105 open. When the mine is moored the pull of cable 20 passing over pulley 69 will tilt lever 116 pivoted at 117 to a projection 118 on plate 74, and attached at one end to a projection 119 on said resilient chamber, will cause the chamber to expand, and the bell-crank knife

switch blades 120 to be moved by arm 121 into engagement with contacts 122, thus completing the circuits. Whenever the pull of cable 20 ceases, the chamber is designed to contract and open the switches again. A stop 123 may be provided to prevent further movement of lever 116 when the switches are closed.

After the buoyant portion of the mine has risen to within a predetermined distance from the surface of the water, weight 60 which is locked to cable 18, is designed to be released by hydrostatically controlled means such as is shown and described in my aforementioned copending application, and to glide down along said cable until it strikes the top of a locking member 124 fitted over shaft 50. A shearing pin 125 passing through said locking member into shaft 50 is provided to hold the locking member in an inoperative position. The shock of the falling weight upon the locking member is designed to shear this pin and move lugs 126 on said locking member through openings 127 in bracket 128 into notches 129 in drum 61, to prevent further rotation of drum 61 and feeding out of cable 18 and thus hold the buoyant portion at the desired depth. A slot 130 is shown in the sleeve or hub portion of the locking member, to permit the latter to move downwardly over cable 18. A similar slot, not shown, may be provided where air tube 48 passes into shaft 50.

At 131 I have shown a rudder or fin pivotally attached to the end of the buoyant portion of the mine at 132. Normally, said rudder is retained within the anchor portion of the mine, but is pressed outwardly against the walls of said anchor portion, so that when the portions become separated, the rudder will assume the position shown by dotted lines 131′ in Fig. 1, or by the full line position in Fig. 7. As also shown in the latter figure I may employ a second rudder or fin 134, mounted and actuated similarly to rudder 131.

The purpose of these rudders is illustrated in Fig. 9, wherein two mines are shown in positions A and B as a ship C approaches. In positions A and B the rudders 131 are shown projecting toward and away from the ship respectively. The displacement currents D flowing along the side of the ship to fill the space vacated by the ship are shown passing around the mines. The purpose of the rudder is to cause the mine to be swung around to the dotted line positions A′ and B′, so that as the ship moves along as shown by the dotted line position C′ the fragile tubes 79 will be turned so as to lie adjacent the hull of the ship, thereby insuring the breaking of the tubes when the ship strikes the mine.

In order that the mine will not drag its anchor when swayed by the currents caused by the passing ship, or by tides, I may employ a mud hook 135 placed in the bottom of the anchor portion of the mine, and attached thereto by means of a cable or chain 136. When the mine is launched, the mud hook will fall out from the anchor portion and lie on the bottom of the sea adjacent the said anchor portion as shown in Fig. 7.

In accordance with the provisions of the patent statutes, I have herein described the principle of operation of my invention, together with the apparatus, which I now consider to represent the best embodiment thereof, but I desire to have it understood that the apparatus shown in only illustrative and that the invention can be carried out by other means. Also, while it is designed to use the various features and elements in the combination and relations described, some of these may be altered and others omitted without interfering with the more general results outlined, and the invention extends to such use.

Having described my invention, what I claim and desire to secure by Letters Patent is:

1. A submarine mine adapted to be launched from a torpedo tube, comprising a buoyant explosive portion, an anchor portion, extensible connecting means between said portions, a fragile tube within said buoyant portion adapted to be projected therefrom, means for projecting said tube, and means brought into action as the mine is set for operating said last-named means for causing said tube to be projected therefrom.

2. In a submarine mine, a buoyant explosive portion, an anchor portion, an extensible connection between said portions, a rotatable member connected to said extensible connection, adapted to be actuated by the pull of said extensible connection, a fragile tube within said mine, and means for causing said tube to project from said mine when said rotatable member is actuated.

3. In a submarine mine comprising a buoyant explosive portion adapted to be anchored below the surface of the water by a cable and an anchor, a fragile tube within said mine, means actuated by the pull of said cable for causing said tube to project from said mine, electrodes within said tube, a substance also within said tube adapted upon contact with sea water to form an electrolyte, a detonating charge within said mine, and an electric firing means for said charge in circuit with said electrodes.

4. In a submarine mine having a buoyant explosive portion connected by a cable to an anchor portion, a rotatable member connected to said cable, adapted to be rotated by the pull of said cable, fragile tubes within said

mine, means for causing said tubes to project from said mine when said member is rotated, and means for retarding the rate of rotation of said member.

5. A submarine mine adapted to be launched from a torpedo tube, comprising a buoyant portion adapted to contain an explosive, an anchor portion, an extensible connection between said portions, a member adapted to be struck, within said buoyant portion, means connected to said member and said extensible connection adapted upon the pull of said connection to cause said member to project from said buoyant portion, and means for drawing said member within said buoyant portion when said connection ceases to exert a pull upon said buoyant portion.

6. In a submarine mine comprising a buoyant explosive portion adapted to be anchored below the surface of the water by a cable and an anchor, a fragile tube within said mine, means actuated by the pull of said cable for causing said tube to project from said mine, electrodes within said tube, a substance also within said tube adapted upon contact with sea water to form an electrolyte, an electric firing means in circuit with said electrodes, a normally open switch in said circuit, and means responsive to the pull of said cable for closing said switch.

7. A submarine mine adapted to be launched from a torpedo tube, comprising a buoyant explosive portion and an anchor portion, means for coupling said portions together, means actuated by said launching for uncoupling said portions after a predetermined degree of operation to allow said explosive portion to rise, means for retarding the speed of operation of said last-named means, and means for retarding the rate of speed at which said explosive portion rises.

8. A submarine mine adapted to be launched from a torpedo tube, comprising a buoyant explosive portion and an anchor portion, means for coupling said portions together, said anchor portion being adapted to cause said mine to sink when launched, means set in operation by said launching for uncoupling said portions a predetermined length of time after said launching, to allow said explosive portion to rise, extensible means connecting said portions and means for retarding the rate of speed at which said explosive portion rises from said anchor portion.

9. A submarine mine adapted to be launched from a torpedo tube, comprising a buoyant explosive portion, an anchor portion coupled thereto, means for uncoupling said portions, means for locking said uncoupling means against operation, and means adapted to be actuated by air pressure for unlocking said uncoupling means after a predetermined degree of operation of said last named means.

10. A submarine mine comprising a buoyant portion adapted to contain an explosive, an anchor portion, connecting means between said portions, firing means for said mine including a fragile tube within said buoyant portion adapted to be projected therefrom, and means brought into action as the mine is set in predetermined position for causing said tube to be projected therefrom without removing the explosive from said buoyant portion.

11. A submarine mine comprising a buoyant portion adapted to contain an explosive, an anchor portion, connecting means between said portions, a fragile member within said buoyant portion, means responsive to the mooring of said mine for causing said member to project from said buoyant portion while said explosive is within said portion, and means responsive to the breaking of said tube for exploding said explosive portion.

12. A submarine mine comprising a buoyant explosive portion, an anchor portion, connecting means between said portions, a fragile member within said buoyant portion, means controlled by said connecting means in response to the rising of said buoyant portion with respect to said anchor portion for causing said member to project from said buoyant portion and means responsive to the admission of water into said member for exploding said explosive portion.

13. A submarine mine, a tubular-shaped buoyant portion adapted to contain an explosive, an anchor portion therefor, a cable connecting said portions, fragile members within said buoyant portion and adapted to project from the side thereof, means for affecting such projection, and means on said buoyant portion adapted in response to currents produced by the passing of a ship to turn the side of said buoyant portion toward said ship.

14. In a submarine mine, a buoyant explosive portion, an anchor portion, a cable connecting said portions, a fragile container within said mine, means responsive to the pull of said cable for causing said container to project from said mine, means for drawing said container into said mine when said cable is not pulling, electrodes connected with said container, firing means in said explosive portion in circuit with said electrodes and means for producing an electric current in said circuit when a ship strikes said container.

15. In a submarine mine, a buoyant explosive portion, an anchor portion, means connecting said portions, means operable in response to the depth of submergence of the mine and after a predetermined degree of

operation for rendering said first named means ineffective and permitting unlocking of said portions.

16. A submarine mine comprising a tubular shaped buoyant portion adapted to contain an explosive, an anchor portion, a cable connecting said portions and adapted to hold said buoyant portion in a horizontal position when anchored, a plurality of fragile tubes connected with said mine and adapted to project therefrom, said tubes being positioned in a substantially vertical plane, and means connected with said tubes for exploding said mine.

17. In a submarine mine, a buoyant explosive portion, an anchor portion, means connecting said portions, means operable upon launching of the mine and after a predetermined degree of operation for rendering said first-named means ineffective and permitting unlocking of said portions, and means for retarding the speed of operation of said last-named means.

18. A submarine mine adapted to be launched from a torpedo tube, comprising a tubular shape buoyant portion adapted to contain an explosive, an anchor portion attached to one end of said buoyant portion and adapted to cause said mine to sink and remain in a vertical position when launched, means for releasing said buoyant portion a predetermined length of time after said launching and an extensible connection between said portions adapted to hold said buoyant portion in a horizontal position after said releasing.

19. A submarine mine adapted to be launched from a torpedo tube, comprising a tubular shape buoyant portion adapted to contain an explosive, an anchor portion attached to one end of said buoyant portion whereby said mine will sink and remain in a vertical position when launched, means for releasing said buoyant portion a predetermined length of time after said launching, an extensible connection between said portions adapted to hold said buoyant portion in a horizontal position after said releasing, a projection on said buoyant portion adapted when broken by a ship to explode said mine and means on said buoyant portion for turning said projection toward a passing ship.

20. A submarine mine comprising a tubular shape buoyant container adapted to contain an explosive, a fragile member in said mine adapted to project therefrom, an anchor and an anchor cable for said mine, said cable being adapted to maintain said mine in a horizontal position when moored, means actuated by said cable when said mine is moored for causing said member to project from said mine, means adapted to be acted upon by the currents produced by a passing ship for turning said member toward said ship, firing means for said mine and means adapted to be rendered effective upon the breaking of said member for actuating said firing means.

21. In a submarine mine adapted to be launched from a torpedo tube, a buoyant explosive portion, an anchor portion detachably secured thereto, foldable fins on said buoyant portion, means for detaching said portions, an extensible connection between said portions and means for causing said fins to assume an operative position.

22. In a submarine mine, a buoyant explosive portion, an anchor portion, an extensible connection between said portions, a rotatable member connected to said extensible connection, adapted to be actuated by the pull thereof, a groove in said rotatable member, a second member adjacent said rotatable member having a slot therein, a fragile member within said buoyant portion provided with a base, and a projection on said base passing through said slot into said groove, whereby the rotation of said rotatable member will move said fragile member for causing the same to project from said buoyant portion.

23. In a submarine mine, a buoyant explosive portion, an anchor portion, an extensible connection between said portions, a rotatable member connected to said extensible connection, adapted to be actuated by the pull thereof, a groove in said rotatable member, a second member adjacent said rotatable member having a slot therein, a fragile member within said buoyant portion provided with a base, a projection on said base passing through said slot and into said groove, whereby the rotation of said rotatable member will move said fragile member for causing the same to project from said buoyant portion, a normally closed port in said buoyant portion and means for opening said port when said rotatable member is actuated.

24. In a submarine mine, a buoyant explosive portion, an anchor portion, a retractible E. M. F. producing device adapted to become operative when broken associated with said buoyant portion, detonating means electrically connected to said device, a normally open switch in said connection, a cable connecting said buoyant and anchor portions, and means actuated by the pull of said cable for causing said device to project from the mine and for closing said switch.

25. A submarine mine comprising a buoyant explosive portion and means for causing said mine to sink and to assume a vertical position when launched, means for releasing said buoyant portion from said first named means after the mine has been launched, and means for holding said buoyant portion in a horizontal position after said releasing.

26. A submarine mine comprising an anchor portion, a buoyant explosive portion,

means for coupling said portions together, means actuated by the launching of said mine for uncoupling said portions, and means carried by said buoyant portion adapted in response to currents produced by the passing of a ship to turn the side of said buoyant portion toward said ship, said last-named means being normally ineffective but adapted to be rendered effective by the uncoupling of said portions.

In testimony whereof I have affixed my signature.

ELMER A. SPERRY.