

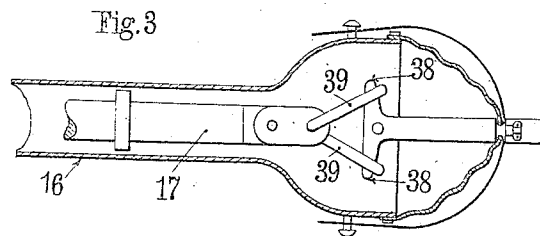
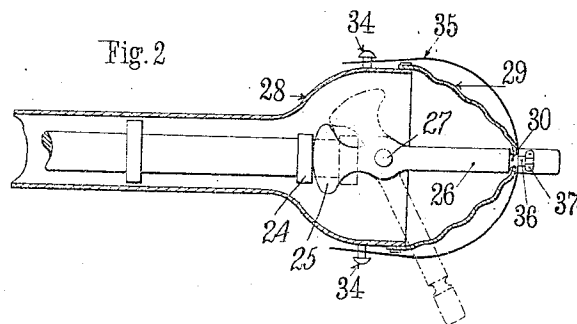
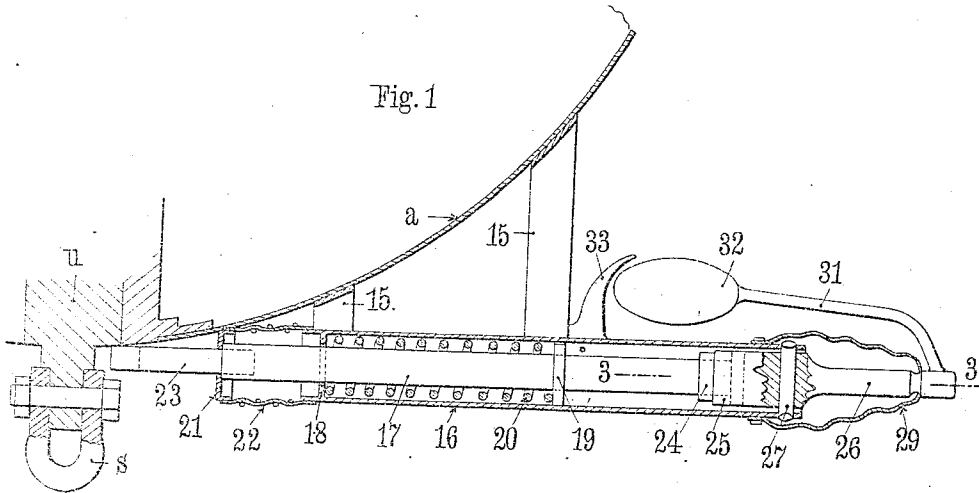
G. E. ELIA.
SAFETY DEVICE FOR OPERATING SUBMARINE MINES.

APPLICATION FILED JAN. 31, 1913.

1,059,852.

Patented Apr. 22, 1913.

3 SHEETS—SHEET 1.



WITNESSES

W. C. Baker
C. S. Rollhaus

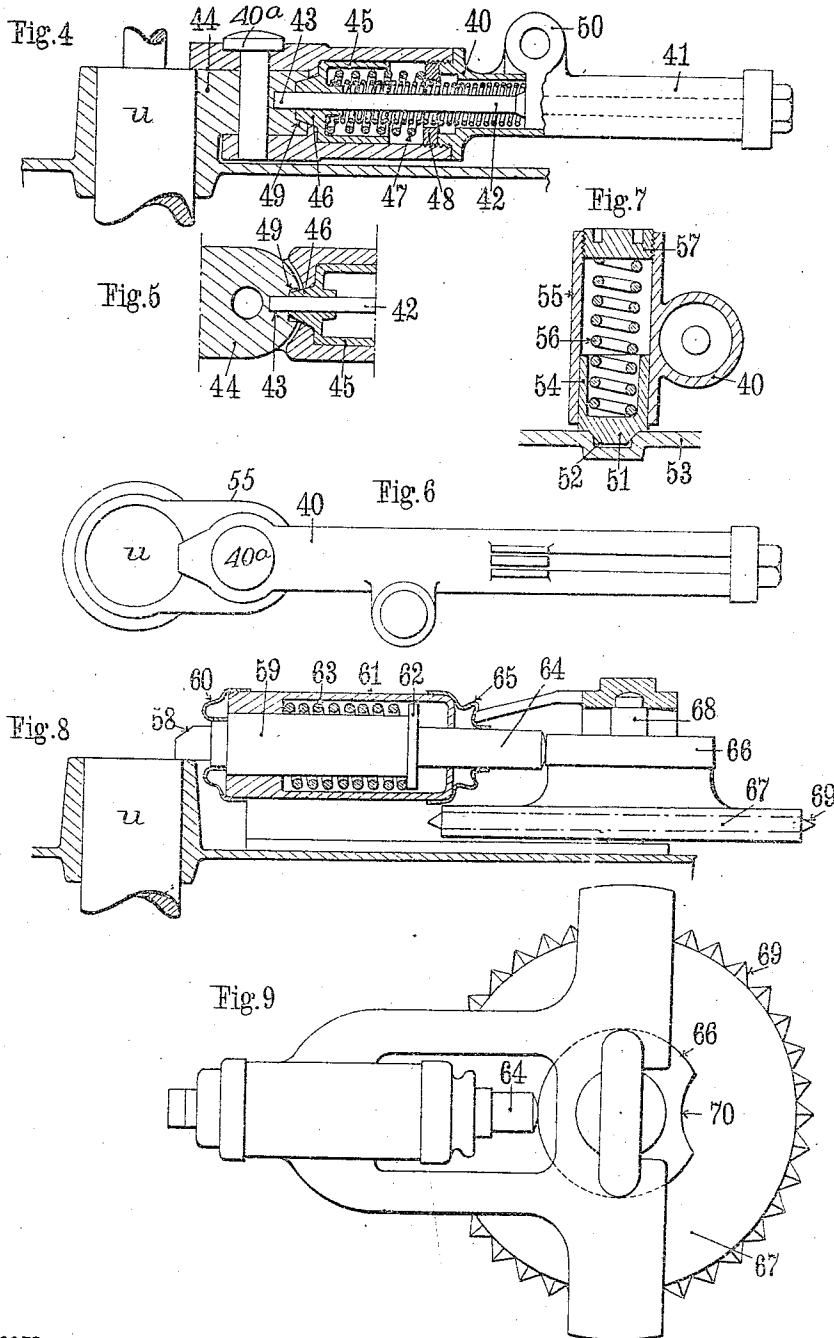
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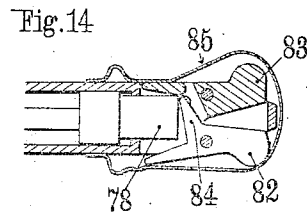
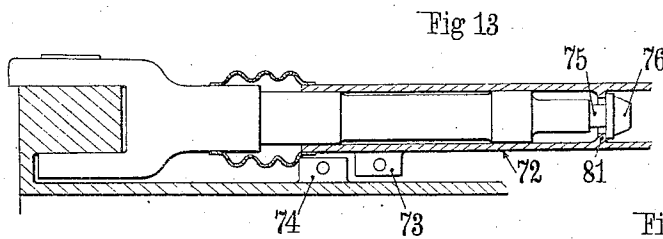
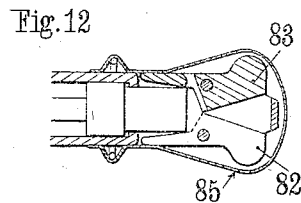
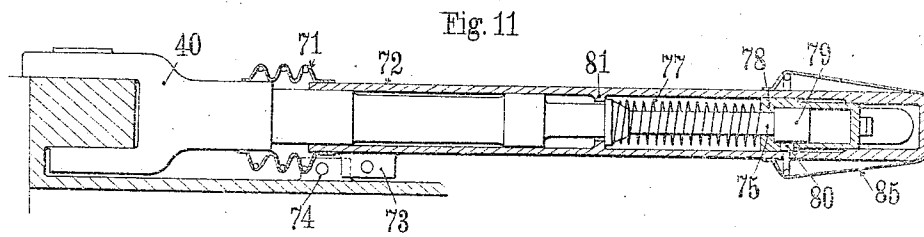
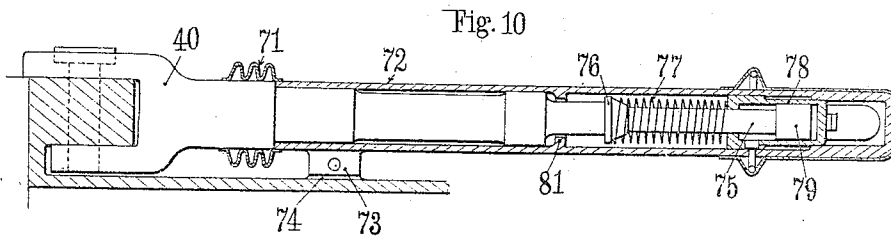
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UNITED STATES PATENT OFFICE.

GIOVANNI EMANUELE ELIA, OF PARIS, FRANCE, ASSIGNOR TO VICKERS LIMITED,
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SAFETY DEVICE FOR OPERATING SUBMARINE MINES.

1,059,852.

Specification of Letters Patent.

Patented Apr. 22, 1913.

Application filed January 31, 1913. Serial No. 745,407.

To all whom it may concern:

Be it known that I, GIOVANNI EMANUELE ELIA, a citizen of Italy, and residing at Hotel de Crillon, Place de la Concorde, Paris, France, have invented certain new and useful Improvements in and Relating to Safety Devices for Operating Submarine Mines, of which the following is a complete specification.

This invention has for its object a safety device for the firing arm of submarine mines or torpedoes and serves more particularly to render this arm or lever insensitive to the force of the sea currents or to the explosion of adjacent mines by preventing it from shifting except under the influence of the friction or the shock of the hull of a vessel.

In the accompanying drawing: Figure 1 is a partial section of the mine and of its lateral arm. Fig. 2 is a section on the line 3-3 in Fig. 1. Fig. 3 illustrates a modification. Figs. 4 and 5 illustrate respectively in vertical section and in horizontal section a safety device for a sliding arm of the usual form. Figs. 6 and 7 illustrate a modification in plan and in partial section. Figs. 8 and 9 are respectively an axial vertical section and a plan of another firing device, and Figs. 10 to 14 illustrate a modification of the device shown in Fig. 1, in its various operative positions, Fig. 12 being an axial horizontal section of Fig. 11 and Figs. 13 and 14 being respectively views corresponding to Figs. 11 and 12 with the parts occupying a different position.

To the lower part of the casing *a* of the torpedo (Fig. 1) there is fixed, by means of arms or brackets 15 (a suitable number of which are provided), a tube 16 in which a rod 17 passing through a partition 18 of the tube is able to slide; this rod comprises a collar 19. A spring 20, which bears upon the partition 18, acts upon this collar 19 and constantly tends to press the rod 17 to the right (Fig. 1): where it leaves the tube 16 this rod carries a cap 21 to which one of the ends of an extensible joint 22 is fixed; the other end of this joint is connected with the tube 16 and the rod 17 is prolonged by a part 23 which, as shown in Fig. 1, serves as support for the collar *u* of the striker mechanism which receives the shackle *s* of the mooring cable. The other end of the rod 17 comprises a head 24 which bears upon the head 25 of an oscillating lever 26 pivoted on

a shaft 27 fixed in an enlarged portion 28 (Fig. 2) of the tube 16. An impermeable casing 29, of india rubber for example, renders the system watertight in bearing upon the part 28 and in a groove 30 in the lever 26.

At the outer end of the lever 26 an arm 31 is fixed (Fig. 1) and supports an oval shaped member 32 forming a rudder, which is arranged to the left of the pivot 27 in such a manner that it balances perfectly, as regards surface and as regards weight, the entire portion located to the right of this pivot, so as to hold the parts in proper position. A screen 33 is arranged in front of the said member 32 to protect it from contact with vegetation and other bodies.

Upon the sides of the part 28 of the tube 16 (Fig. 2) trunnions 34 are provided; upon these trunnions a safety cable 35 is engaged and toward the middle of this cable a fusible block 36, of sal ammoniac for example, is fixed; this block is engaged in the lugs 37 of the lever 26.

For laying the mine in the water the members are caused to occupy the position shown in Figs. 1 and 2, the lever 26 being locked in position for blocking the rod 17 by the cable 35 and the fusible block 36. At the end of a certain period of immersion, this block 36 melts and the lever 26 remains free to oscillation.

When a ship strikes a mine causing it to pivot around its axis in the known manner, the extremity of the lever 26 bears against the ship's side and this lever oscillates around the pivot 27 assuming the position represented in broken lines in Fig. 2. As the rod 17 is no longer retained, under the thrust of its spring 20 it assumes the position represented in broken lines in Figs. 1 and 2, and its extremity 23 releases the collar *u* of the striker mechanism in such a manner that the mine explodes in the known manner. The casing 29 is of a size so as to be loose and owing to which and its being of india rubber it will allow the lever 26 to swing. The casing 29 will sometimes be ruptured when the lever strikes a ship.

While the mine remains in the water, marine vegetation or wreckage cannot act upon the rudder 32 because they are held off by the screen or guard 33. Similarly the explosion of an adjacent mine cannot exert any action upon the position of the lever 26, as

the water pressure resulting from this explosion is exerted equally upon the lever 26 and upon the member 32, the area and leverage of which are equal, in such a manner that the whole remains motionless.

The arrangement described for the sliding rod 17 housed inside the tube 16, rendered watertight on the one hand by the extensible joint 22 and on the other hand by the impermeable covering 29, enables the sliding parts to be protected from the sea water, so that no oxidation or obstruction can prevent this movement, whereby the certainty of operation is increased. Furthermore, as the collar *u* is released by the withdrawal of the part 23 of the rod 17 there is no danger of this movement being prevented by oxidation or the presence of marine growths or shells.

Instead of adopting the arrangement of the lever 26 represented in Figs. 1 and 2, the head 25 might be connected by any convenient joint with the extremity of the rod 17 in such a manner as to produce the withdrawal of this rod without the assistance of a spring, or, as shown in Fig. 3, the head 25 might be replaced by a T-piece 38 the branches of which are engaged in the shackles 39 fixed to the end of the rod 17, to permit of the actuation of this rod for both directions of oscillation of the lever 26. In this case a light spring might be provided which tends to maintain the rod 17 in the position shown in Fig. 1.

In the construction illustrated in Figs. 4 and 5, the arm 40 pivoted at 40^a, comprises the usual sliding rod 41 prolonged internally by a rod 42, the end of which is engaged in a recess 43 formed in the bracket 44 upon which this arm 40 is pivoted. Inside the arm 40 a sleeve 45 is arranged; this comprises a frusto-conical nose 46, which, under the influence of a spring 47 bearing upon an adjustable nut 48, is able to engage in a cup 49 in the bracket 44, the inner face of which is rounded as shown in Fig. 5. The rod 41 is provided with an eye 50 which is arranged between and registers with similar eyes on the arm 40 and in these eyes sal ammoniac is placed to lock the rod 41 in position. Owing to this arrangement, the locking during manipulation is insured by the extremity of the rod 42 entering the recess 43, but when at the end of a certain time of immersion the sal ammoniac which in the usual manner locks the eye 50 of the rod 41, has melted, the whole arm constituted by the rods 41 and 42 is pressed toward the right. The lever is then merely retained by the nose 46 which, under the influence of the spring 47, enters the cup 49 to a sufficient extent to prevent any oscillation of the arm 40 under the action of currents, or the explosion of adjacent mines. When a ship strikes against the mine, it exerts upon the extremity of the rod 41 a sufficient effort to

release the nose 46 from its cup 49, in such a manner that the arm 40 swings on its pivot so as to move its end from engagement with the collar *u* and allow the striker to be operated.

In Figs. 6 and 7, the locking, after launching, is insured by a frusto-conical bolt 51 engaged in a cup 52, with rounded edge formed in the wall 53 of the mine. The bolt 51 is carried by a socket 54 guided in a vertical cylinder 55 integral with the arm 40. The spring 56 of the sleeve 54 also comprises a regulating nut 57.

In the construction as illustrated in Figs. 4 to 8, the provision of a spring bolt renders it possible to regulate with the necessary precision the effort required for producing the rotation of the arm in overcoming the tension of the spring of the bolt, in such a manner that, prior to mooring the mine, the tension of this spring can be regulated in accordance with the strength of the current in which it will be immersed and in accordance with the proximity of other mines.

In Figs. 8 and 9, the finger 58 for retaining the striker is integral with a piston 59 housed in a cylinder 61 with the interposition of a watertight packing 60. This piston 59 comprises a collar 62 against which a spring 63 bears. A counter rod 64 passing through the cylinder end in a watertight packing 65, bears against the rim 66 of a wheel 67 mounted on the vertical shaft 68. On its periphery this wheel comprises protuberances or teeth 69 and its rim 66 comprises a recess 70 the depth of which is at least equal to the extent to which the finger 58 overlaps the collar of the striker. When the mine is in its immersion position, obviously the firing mechanism cannot be influenced by the strength of the currents or by the pressure due to the explosion of adjacent mines. When a ship strikes this mine, it produces by friction a rotation of the wheel 67 owing to the presence of the protuberances or teeth 69. When the recess 70 of the rim 66 comes opposite the extremity of the counter rod 64, the latter being pressed back by the spring 63, enters the recess 70 and the finger 58 yields before the collar of the striker, thereby exploding the mine in the usual manner.

In the construction illustrated in Figs. 10 to 14, the pivoted arm 40 enters a socket 72 with the interposition of a watertight joint 71, this socket comprises a nose 73 which, in the normal position illustrated in Fig. 10, comes between the lugs 74 integral with the mine, with the interposition of a fusible block of sal ammoniac or the like. The arm 40 ends at its outer extremity in a rod 75 with which a movable collar 76 engages; this collar serves as support for a spring 77 which also bears upon the front face of a box 78, in which the rod 75 ends

in a head 79 containing the locking finger 80 (Fig. 11). The socket 72 comprises an inner collar 81 and at the outer extremity of this socket two levers 82, 83 are pivoted, each of them comprising an arm 84 resting upon the extreme face of the box 78. The whole is rendered watertight by an impermeable covering 85. During the manipulation of the mine on the surface, the arm 40 is locked by the nose 73 (Fig. 10) and the lugs 74 by means of a plug of sal ammoniac. When, after a certain time of immersion, the sal ammoniac has melted, as the nose 73 is no longer held, it assumes the position shown in Fig. 11 the collar 81 of the tube bearing against the movable collar 76, and the spring 77 maintains the nose 73 slightly in engagement with the lugs 74, which is sufficient to prevent the arm 40 from pivoting under the influence of currents or of explosions of adjacent mines. When a ship strikes the mine, it causes the lever 82 to occupy, say, the position represented in Fig. 14 and the arm 84 of this lever bearing upon the box 78 causes an outward movement of the socket 72 which brings the nose 73 into the position illustrated in Fig. 13, in such a manner that, as the arm 40 is no longer retained, it is free to swing to move its end from engagement with the striker, as in the other forms of the device to explode the mine.

The various forms of construction described prevent any action by the currents or of the explosion of adjacent mines upon the firing lever, thereby affording great security while at the same time the mine is highly sensitive to the shock or contact of a ship.

It will be understood that the form of the parts described can be modified without thereby affecting the principle of the invention.

The invention is applicable to submarine mines of all kinds in which the striker is released by the contact of the mine with a vessel in motion.

What I claim is:

1. In a submarine mine, the combination with the striker mechanism of the mine, of a locking and releasing device for the striker mechanism comprising a sliding and spring pressed member, and a pivoted member, one of the said members engaging the striker mechanism to lock it in inoperative position, and the other member holding the first member in position and adapted to be moved by contact with an object to release the said first named member.

2. In a submarine mine, the combination with the striker mechanism of the mine, of a locking and releasing device for the striker mechanism, comprising a sliding and spring pressed member, a pivoted member, one of the said members engaging the striker mechanism and held in engagement

therewith by the other member, and means whereby the said other member will be retained in position until engaged by an object when it will be moved to release the member engaging the striker mechanism.

3. In a submarine mine, the combination with the striker mechanism of the mine, of a locking and releasing device for the striker mechanism, comprising a sliding member having one end engaging the striker mechanism to hold it in inoperative position, and a pivoted member controlling the movement of the sliding member, and means for holding the pivoted member in position until engaged by an object when it will be swung to allow the sliding member to release the striker mechanism.

4. A locking and releasing device for the striker mechanism of a submarine mine, comprising a tube, a slidable rod in the tube and having one end projecting from the tube and adapted to engage the striker mechanism, a lever pivoted to one end of the tube and controlling the movement of said sliding rod, and means for holding the lever in position until struck by an object, when it will be swung laterally to permit the sliding rod to release the striker mechanism.

5. A locking and releasing device for the striker mechanism of submarine mines, comprising a tube, a sliding and spring pressed rod in the tube and having one end projecting from the tube and adapted to engage the striker mechanism, a lever engaging one end of the sliding rod, and means for holding the lever in position, said means permitting the lever to swing when struck by an object to release the said rod.

6. A locking and releasing device for the striker mechanism of a submarine mine, comprising a tube, a sliding and spring pressed rod in the tube and having one end projecting from the tube and adapted to engage the striker mechanism of the mine, a lever pivoted to one end of the tube and engaging one end of the sliding rod, and a casing of flexible impermeable material secured to the outer end of the tube and through which the lever projects.

7. A locking and releasing device for the striker mechanism of submarine mines, comprising a tube, a sliding and spring pressed rod in the tube, and having one end projecting out through the tube and adapted to engage the striker mechanism, a lever pivoted to one end of the tube and engaging one end of the sliding rod, and means locking the lever in position comprising a cable having its ends secured to the tube, and a soluble block at its middle and in engagement with said lever.

8. A locking and releasing device for the striker mechanism of submarine mines, comprising a tube, a sliding and spring pressed

rod projecting beyond the tube and adapted to engage the striker mechanism, a lever pivoted to one end of the tube and engaging one end of the sliding rod, an inwardly
5 extending rudder on the outer end of the lever, a shield in front of the rudder, and means for holding the lever in position, said means permitting the lever to swing when the lever engages an object.

- 10 9. A locking and releasing device for the striker mechanism of submarine mines, comprising a tube, a sliding and spring pressed rod in the tube and projecting beyond the tube, the projecting portion having a re-

duced end, a cap on the reduced end of the rod, a flexible joint connecting the cap with the tube, a pivoted lever at one end of the tube and engaging the end of the sliding rod, and a casing of flexible impermeable material secured to the end of the tube and
20 through which the lever projects.

In testimony whereof I have hereunto set my hand, at Rome, Italy, this 18th day of January, 1913.

GIOVANNI EMANUELE ELIA.

In the presence of two witnesses:

GIOVANNI VALATELLI,
TORELLO FONTARI.