F. E. LANDER.

MEANS FOR PARTING THE MOORINGS OF SUBMARINE MINES OR MINE SWEEPING ROPES OR CABLES.

APPLICATION FILED JUNE 26, 1918.

1,312,405.

Patented Aug. 5, 1919.

2 SHEETS—SHEET 1.

FIG. 1.

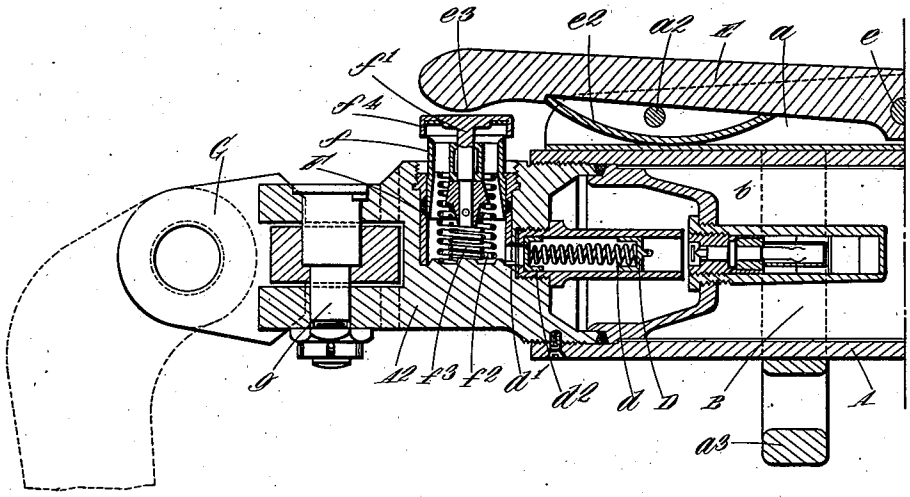


FIG. 2.

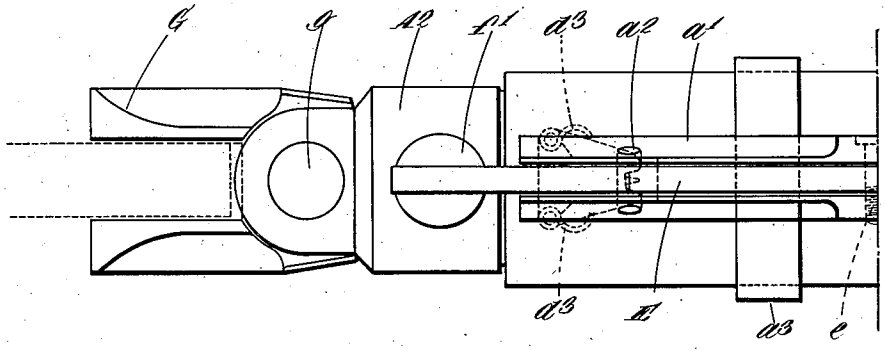
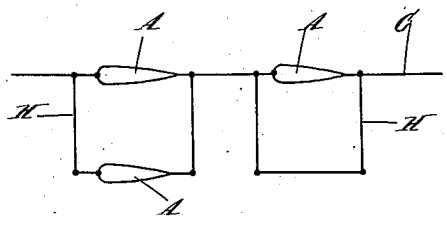


FIG. 3.



Frank Eaton Lander,
Inventor.

Pennie, Davis, Marvin & Edmonds,
attorneys.

F. E. LANDER.

MEANS FOR PARTING THE MOORINGS OF SUBMARINE MINES OR MINE SWEEPING ROPES OR CABLES.

APPLICATION FILED JUNE 26, 1918.

1,312,405.

Patented Aug. 5, 1919.

2 SHEETS—SHEET 2.

Fig. 1. continued.

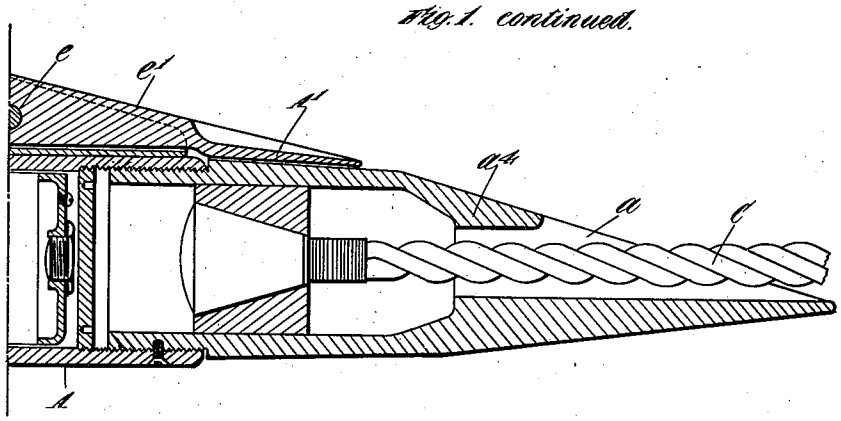
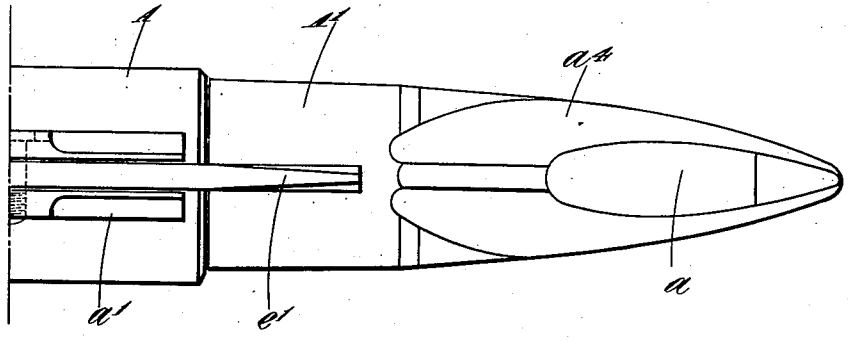


Fig. 2. continued.



Frank Eaton Lander,
Inventor,
Pennie, Davis, Marvin & Edmonds,
attorneys.

UNITED STATES PATENT OFFICE.

FRANK EATON LANDER, OF BLACKHEATH, LONDON, ENGLAND, ASSIGNOR TO VICKERS LIMITED, OF WESTMINSTER, ENGLAND.

MEANS FOR PARTING THE MOORINGS OF SUBMARINE MINES OR MINE-SWEEPING ROPES OR CABLES.

1,312,405. Specification of Letters Patent. Patented Aug. 5, 1919.

Application filed June 26, 1918. Serial No. 242,104.

To all whom it may concern:

Be it known that I, FRANK EATON LANDER, a subject of the King of Great Britain, residing at 24 Eliot Park, Blackheath, in the county of London, England, have invented certain new and useful Improvements in Means for Parting the Moorings of Submarine Mines or Mine-Sweeping Ropes or Cables, of which the following is a specification.

This invention relates to improved means by which the mooring cables of submarine mines may be severed or, on the other hand, the moorings of mines may be protected from mine sweeping devices by severing the mine sweeping ropes or cables, the means being of the type in which an explosive charge associated with a mooring or mine sweeping cable is adapted to be fired by the action of an opposing cable and to sever such opposing cable.

According to this invention the rope, wire or cable (hereinafter referred to as a cable) used for mooring or for mine sweeping purposes is provided with an explosive link over which the opposing cable is adapted to slide and during its passage to operate by pressure firing mechanism belonging to the link, whereupon the link is destroyed and the opposing cable severed. To prevent the explosion of the charge parting the cable to which it is connected, a secondary connection may be provided which takes up the tension of the cable when the link is destroyed. The said connection may itself carry another explosive link and be provided with a further connection or connections between points on opposite sides of the explosive link or links, any number of connections and links being fitted according to the requirements.

The firing device is preferably of a type which cannot be operated until the link is submerged and for this purpose the spring of the firing pin may be normally unenergized and energized only when the opposing cable operates a lever which acts upon a cylinder and piston device to transmit pressure through water trapped in the said device, so that until submersion the necessary operative connection between the lever and firing pin does not exist.

In order that the said invention may be clearly understood and readily carried into effect I will describe the same more fully with reference to the accompanying drawings, in which:—

Figure 1 is a longitudinal section of an explosive link embodying this invention.

Fig. 2 is a plan of the same; and

Fig. 3 shows diagrammatically an arrangement of such links connected up to a cable.

A is the link casing containing an explosive charge B provided with detonator *b*. C is the cable connected to the end member A′ through the longitudinal aperture *a* into which the end of the cable passes. D is the firing pin with spring *d* normally unenergized. E is the firing lever. F is a cylinder mounted in the tail piece A^2 of the link and receiving the sliding piston *f* made in the form of an open cylinder provided with the closing cap *f′*, the piston and cap acting against the springs f^2 and f^3. G is an eye mounted on the knuckle joint *g* on the end of the tail piece A^2, by means of which the link is connected up to another part of the mine sweeping or mooring cable or to a towed member by which the mine sweeping is effected. H, H are the secondary connections by means of which the cable is kept unsevered when a link is exploded.

When the link is out of the water the position of the firing mechanism is as shown in Fig. 1, the spring *d* being uncompressed so that by no possible action of the mechanism can the detonator *b* be fired. This results from the fact that the cylinder F contains air at atmospheric pressure so that even if the piston *f* and cap *f′* be pressed in the air would not be compressed to a pressure sufficient to actuate the firing pin, which moreover is separated from the cylinder space by the small diaphragm *d′* of metal foil, celluloid, rubber or other suitable material which is clamped in place and protects the inner mechanism from contact with the water. The firing lever E, which is pivoted at *e* between two long lugs *a′* on the casing A, is normally held up by a safety pin passed through the hole a^2 in the said lugs, which pin is removed before submersion of the link. A body ring a^3 is provided for lifting the link by a suitable connection.

The link is so connected up that if an opposing cable, either the mooring or the mine sweeping cable, meets it, the cable is

caused to slide up the sloping face a^4 of the end piece A′ and thence over the sloping tail e' of the lever. When it passes the pivot e it begins to press down the lever against the spring e^2 causing the rounded end e^3 to meet the piston cap f'. The cylinder F has already been filled with water on submersion of the link, the cap f' just clearing the top of the cylinder to permit of this, and the first action of the lever is to press the cap f' down against the pressure of its light spring f^3 until the lead ring or washer f^4 meets the upper end of the open piston f, closing its outer end and so trapping the water within the cylinder. The closed piston is then compressed against its spring f^2 and the pressure of the water increased until the copper diaphragm d' yields, when the firing pin spring d is compressed through the small terminal piston d^2. The firing pin is held back by a spring catch d^3 of any suitable type, indicated in dotted lines in Fig. 2, until the compression reaches a predetermined amount, when the catch is overcome and the firing pin freed, moving forward under the pressure of the now energized spring and striking the detonator cap.

If the cable is provided with the secondary connections H as indicated in Fig. 3 the explosion of a link will simply allow the corresponding connection to straighten out and take the pull of the cable. Two or more explosive links may be provided as shown, each with its secondary connection, and one or more of the connections themselves may be provided with an explosive link, as indicated.

What I claim and desire to secure by Letters Patent of the United States is:—

1. In cable severing means by which a cable to be protected effects the severing of an opposing cable, a link for the cable to be protected, an explosive charge provided in the said link, firing mechanism adapted to be operated mechanically and an operating lever mounted on the link, by which the said firing mechanism is operated by pressure of the opposing cable as it passes over the said lever, whereupon the link is destroyed and the opposing cable severed.

2. In cable severing means, a cable provided with an explosive link adapted to be fired by the pressure of an opposing cable and a secondary connection connecting up the cable to be protected on either side of the explosive link, the secondary connection being adapted to take up the strain of the cable on the explosion of the link.

3. In an explosive link as claimed in claim 1, a safety device preventing the firing of the link by the opposing cable until the link is submerged.

4. In an explosive link adapted for cable severing purposes, firing mechanism, a member adapted to be operated by the opposing cable and a device interposed between the said member and the firing mechanism, which device is filled with water on submersion of the link so as to provide an operative connection between said member and the firing mechanism.

5. In an explosive link for cable severing purposes, firing mechanism, a member adapted to be operated by the opposing cable, a chamber adapted to be filled with water on submersion of the link and means for trapping the water in the chamber on operation of the said member by the opposing cable, the trapped water forming an operative connection between the cable operated member and the firing mechanism.

6. In an explosive link for cable severing purposes, a firing pin, a normally unenergized firing spring, a lever adapted to be actuated by the opposing cable, a chamber interposed between the lever and the firing pin, adapted to be filled with water on submersion of the link, a means for closing the said chamber on operation of the lever, whereupon the pressure from the lever is transmitted through the water so as to energize the firing spring and operate the firing pin.

7. An explosive link for cable severing purposes, provided with an end member through which a cable end is led and secured, the said member having an inclined guiding surface, a longitudinally disposed firing lever over which the opposing cable is guided and firing mechanism adapted to be operated by the said lever.

In witness whereof I affix my signature.

FRANK EATON LANDER.