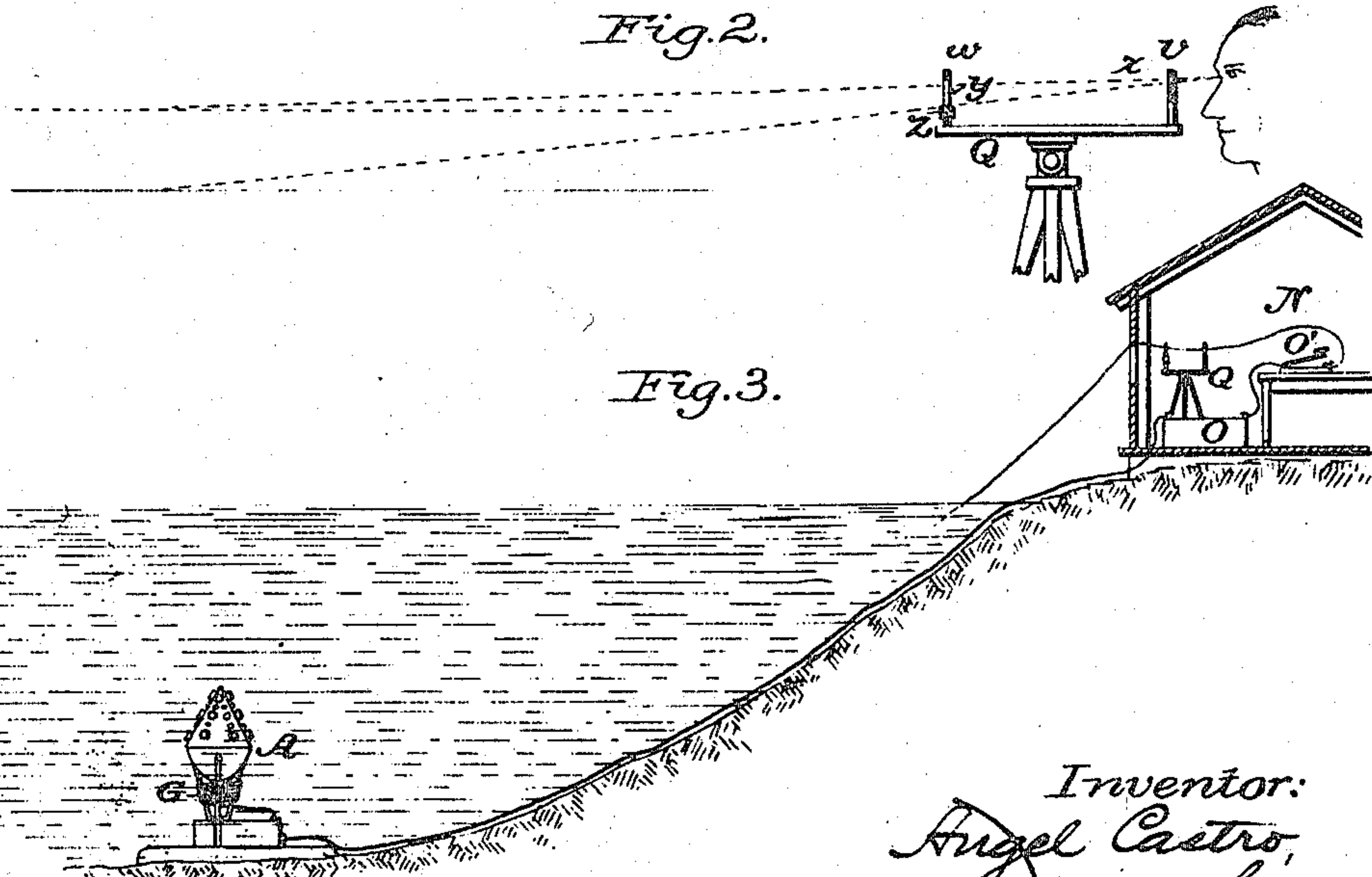
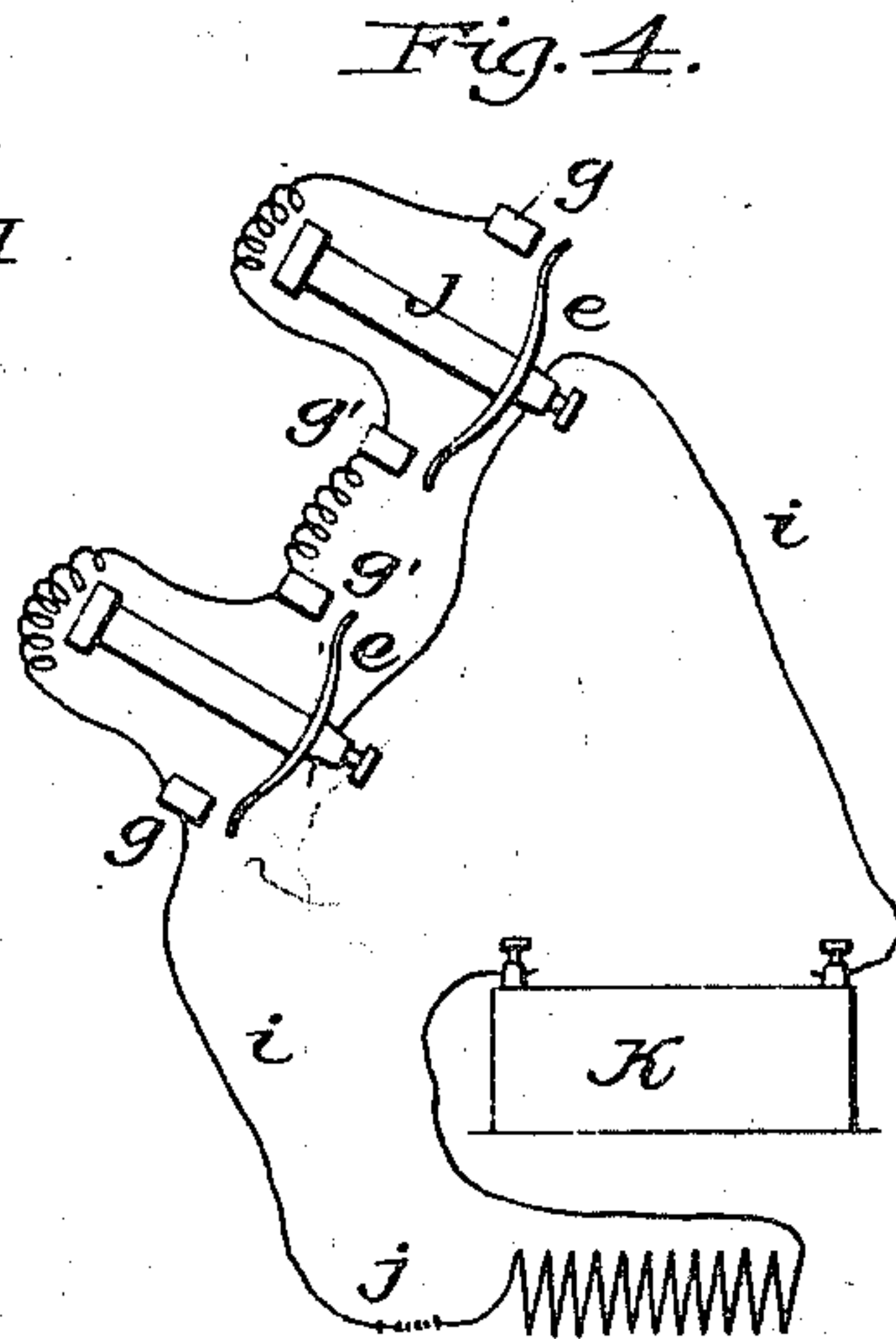
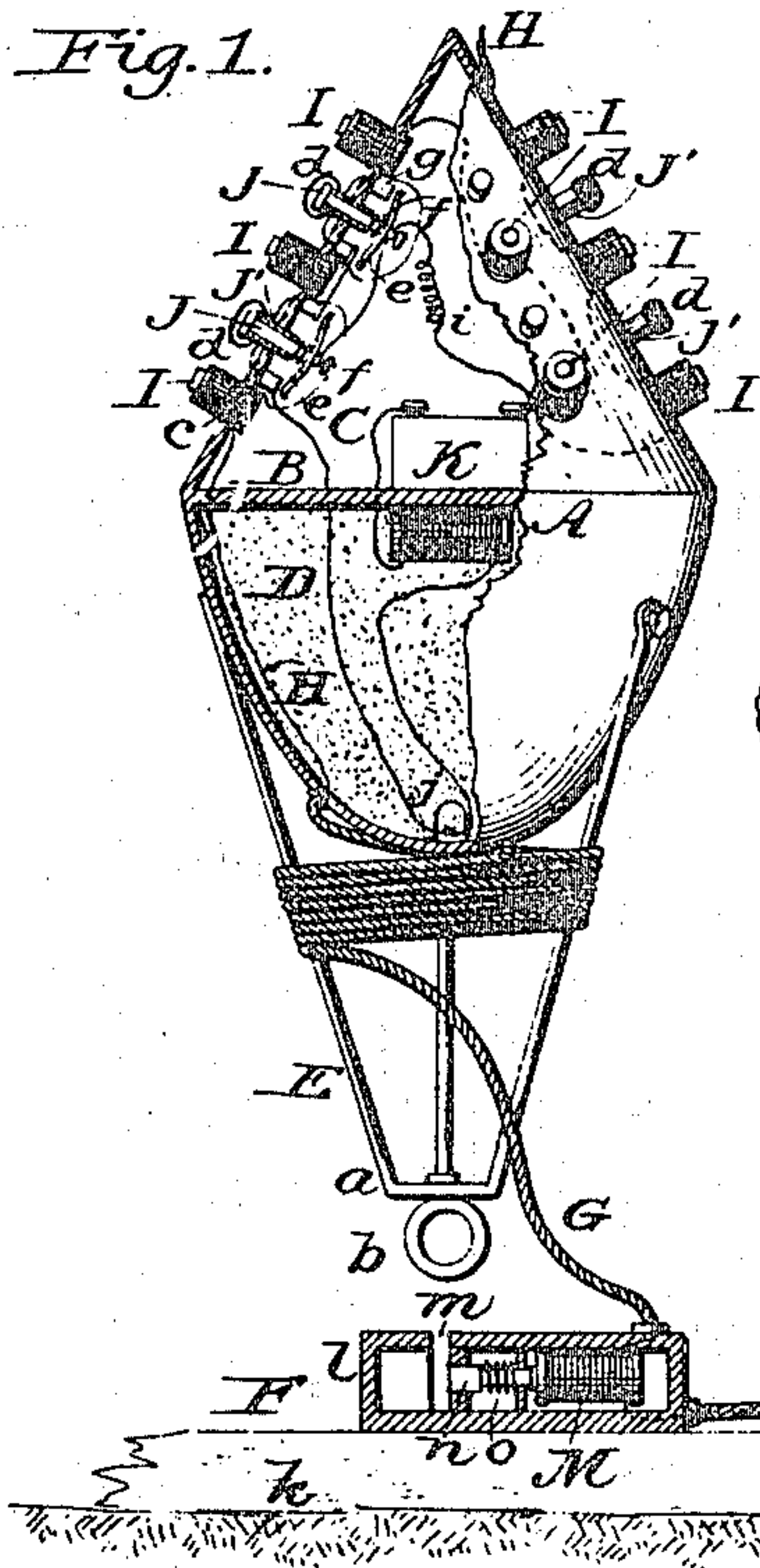


(No Model.)

A. CASTRO.  
MARINE TORPEDO.

No. 322,900.

Patented July 28, 1885.



Witnesses:  
Jas. F. Outland  
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# UNITED STATES PATENT OFFICE.

ANGEL CASTRO, OF NEW YORK, N. Y.

## MARINE TORPEDO.

SPECIFICATION forming part of Letters Patent No. 322,900, dated July 28, 1885.

Application filed May 19, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, ANGEL CASTRO, of New York city, in the county of New York and State of New York, have invented certain new and useful Improvements in Torpedoes, of which the following is a specification.

My invention relates to a torpedo and anchorage therefor designed for submarine use; and it consists in a novel construction of the same hereinafter fully explained, whereby the torpedo is held submerged below the draft-line of the largest vessels until released by the manipulation of an electrically-controlled detent, whereupon the torpedo rises, attaches itself to the vessel, and is automatically fired or exploded.

In the accompanying drawings, Figure 1 is a side elevation of the torpedo, partially in section; Fig. 2, a view illustrating the mode of ascertaining the position of the same; Fig. 3, a view illustrating the mode of employing the torpedo; Fig. 4, a diagram showing the arrangement of circuits.

A indicates the shell or casing of the torpedo, which is divided by a horizontal partition or diaphragm, B, into an upper chamber, C, and lower chamber, D, the former containing air to give the necessary buoyancy, and the latter containing a charge of powder, dynamite, gun-cotton, or other explosive.

The shell may be made of iron, copper, or other suitable metal or material, and is preferably in the form of a cone or pyramid, with a hemispherical base or lower end, though the form may be varied as desired.

Secured to the lower part of the torpedo is a frame, E, formed of iron rods attached at their lower ends to a plate, *a*, to the under side of which is secured a ring or loop, *b*. The purpose of the frame and ring is primarily to provide means of attachment to the anchorage F. The frame also serves as a weight or ballast to hold the torpedo in an upright position, point uppermost, and as a drum or body on which to wind a cable, G, through which an electric conductor, H, is carried. Said conductor H connects with or is wound to form the coils *c* of a series of stationary electro-magnets, I, projecting from the face of the conical upper portion of the shell A on all sides.

The conductor may be wound around one

core after another of the various magnets I, or it may be divided up into a number of smaller conductors, each carefully insulated and running to one core or series or cores, and all reuniting above the magnets, or simply uncovered and allowed to enter the water.

If separated into a series of smaller conductors, care must be taken to wind all the cores exactly alike to prevent the current from selecting one magnet or series of magnets to the exclusion of others.

Between the electro-magnets I, and wholly independent of and disconnected from the same, are cylindrical permanent magnets J, each arranged to slide longitudinally through an insulating sleeve or tube, J', extending through the wall of the chamber C. The outer end of each magnet J is covered by a cap, *d*, of thin rubber, which serves to completely exclude the water from the chamber C, at the same time permitting the magnets J to be more loosely fitted, and consequently to move more freely than would be possible if a watertight joint were required between the magnets and their insulating-sleeves. Each magnet J carries at its inner end a spring cross bar or strip, *e*, and is encircled by a light coiled spring, *f*, which serves to draw the magnet inward and to hold the ends of the cross-bar *e* away from contact-blocks *g g'*, with which it makes contact when the magnets slide outward.

The outer ends of the sliding permanent magnets J do not project so far from the shell when the springs hold them inward as do the cores of the electro-magnets, but come flush therewith when drawn out.

K indicates a battery located in the upper or air chamber, C, and L a resistance coil introduced in the battery-circuit, which circuit is formed by two wires, *h* and *i*. Wire *h* connects with or is wound to produce the coil L, and passes thence downward into chamber D, where it is furnished with a short length, *j*, of platinum, iridium, carbon, copper, or like substance, from which it passes to and connects with the contact-blocks *g g'*, its other end being connected with one pole of the battery K. Wire *i* passes from the other pole of the battery to the cross-pieces *e e* of the sliding permanent magnets J J. When, therefore, the magnets J J move outward, the circuit is com-



pleted through battery K, coil L, wire *h*, section *j*, contacts *g g'*, cross-pieces *e e*, and wire *i*, heating the portion *j* to incandescence, and thereby igniting the charge.

5 Referring to Fig. 1, the anchorage F will be seen to include a base, *k*, which may be of metal, stone, or like heavy material, and a block, *l*, having a vertical slot or recess, *m*, to receive the ring *b* of the torpedo, which is re-  
10 tained in the recess by a sliding bolt, *n*, urged forward by a spring, *o*.

The insulated cable G, which is wound about the frame E of the torpedo, is attached to the block *l*, enters the same, and is wound about  
15 an iron core therein, thus forming an electro-magnet, M, for which the sliding block *n* serves as an armature. When, therefore, the electro-magnet M is energized, the bolt *n* is attracted thereby and withdrawn from ring *b*,  
20 thus releasing the torpedo and allowing it to rise toward the surface. The cable G continues to the shore or operator's station N, where it connects with a battery, O, having a circuit-closer, O', from which a second wire or con-  
25 ductor, *p*, runs to the water or back to the torpedo, connecting with the conductor H of cable G at a point above the electro-magnets I. The return-wire is, however, unnecessary, the water forming an adequate return.

30 Whenever a vessel is found to be over the torpedo, or so near as to come over it by the time the torpedo rises, the operator at the controlling-station moves the circuit-closer O' to close the circuit, the electro-magnet M is  
35 energized and withdraws the bolt or detent *n*, thereby releasing the torpedo, which then rises toward the surface. At the same time and by the same action the electro-magnets I are energized, and as the torpedo rises it comes  
40 into contact with the iron or steel of the vessel, if it be an armored one, and the electro-magnets, by reason of their strong attraction for the iron or steel, attach themselves to the metal, and thus firmly attach the torpedo to  
45 the vessel.

I am aware that it has been proposed to provide a torpedo with a permanent magnet or with a series of such magnets for the purpose stated; but it is manifest that an ade-  
50 quately firm attachment cannot be thus secured, the relation between the weight of the magnets and the attractive power thereof being such that a proper amount of magnetized metal cannot be carried at the upper part of  
55 a torpedo of practicable size, where of course they must be located.

When the magnets I attach themselves to the metal of the vessel, said metal is within the field of attraction of the permanent mag-  
60 nets J, which at once move outward toward such metal, and in doing so carry the cross-pieces *e e* into contact with the blocks *g g'*, and complete the circuit of the local battery K, whereupon the section *j* becomes heated  
65 to incandescence, as above stated.

It will be seen that under this construction the torpedo is harmless to wooden vessels,

but acts automatically upon armored vessels; that it is under perfect control of the operator, and that no netting or guard, such as  
70 now used as a protection against ordinary torpedoes, can prevent the action of this.

In Fig. 2 I have shown a simple device for determining the depth of the torpedo, in order to calculate the time required for it to  
75 rise to the vessel passing above it. This consists, simply, of a horizontal bar or plate, Q, with two upright arms, *v* and *w*, the former provided with a small eye-hole, *x*, and the latter with a slit, *y*, and vertically-movable  
80 slide, *z*. At the side of the slit are marks or graduations, and knowing the location of the torpedo it is only necessary to move the slide so that in looking through the hole *x*, directly  
85 across the top of slide *z*, the line of sight shall fall directly over the spot where the torpedo is located. The upper and lower graduations are made to indicate the position of the slide at high and low tide, and the intermediate  
90 marks merely indicate fractions of the difference between the two.

The torpedo herein described is simple and effective, and may be manipulated without danger.

Having thus described my invention, what  
95 I claim is—

1. The herein described apparatus for effecting submarine explosions, consisting of a torpedo having an eye or loop, an anchorage  
100 at the bed of the stream or basin, provided with an electro-magnet, and a bolt or detent serving to engage the eye of the torpedo, and adapted to be withdrawn by the electro-magnet, a battery, and a circuit-closer located at a  
105 convenient point for manipulation and adapted to close the battery-circuit.

2. In combination with a torpedo having its shell provided with an eye or loop, *b*, an anchorage therefor below the water, provided  
110 with electro-magnet M, a sliding bolt, *n*, serving as an armature for said magnet, a battery, O, a conductor, H, extending from the battery to the electro-magnet, and a circuit-closer, O', adapted to complete the battery-circuit and to cause the withdrawal of the bolt *n*.  
115

3. The combination of a submarine torpedo provided with exterior electro-magnets and with an eye or loop, an anchorage located be-  
120 neath the water, an electro-magnet located in said anchorage, a sliding bolt placed within the field of attraction of said magnet, a battery, an insulated electric conductor extending from the battery to the electro-magnet of the anchorage, and thence to the external  
125 electro-magnets of the torpedo, and a circuit-closer, all constructed and arranged substantially as shown and described, whereby the closing of the circuit is caused to release the  
130 torpedo from its anchorage and to prepare the electro-magnets to fasten the torpedo to an armored vessel.

4. In combination with the shell A, containing an explosive, electro-magnets I on the outer face thereof, external battery, O, and a



circuit-wire connecting the battery O and the electro-magnets I, as and for the purpose set forth.

5 5. A torpedo provided with an electric battery, and with a movable permanent magnet (one or more) carrying a circuit-closer for said battery, the permanent magnet being exposed at the exterior of the torpedo, so that when brought close to the armor or metal of a ves-  
10 sel the magnets will be automatically drawn out and caused to close the battery-circuit.

6. The herein-described torpedo, consisting of a shell containing an air-space and a space for explosive material, a battery, an interrupted conductor connected with opposite poles of  
15 the battery, and containing a portion adapted to be heated by the passage of an electric current through it, a circuit-closer for said conductor, and a permanent magnet connected  
20 with said circuit-closer and adapted to move outward automatically and close the circuit when brought close to an external body of iron or steel.

7. A torpedo consisting of shell A, electro-

magnet I on the outer face thereof, cable *b*, 25 connecting the torpedo and its releasing device, external battery, O, internal battery, K, movable permanent magnets J, projecting from the face of shell A, and provided at their inner ends with circuit-closers *e*, contact-blocks  
30 *g g'* on the interior of the shell, and wires *h i*, connecting the opposite poles of the internal battery, K, with the circuit-closers *e*, and contact-blocks *g g'*.

8. In combination with shell A, containing 35 explosive material, internal battery, K, movable magnets J on the outer face of the shell, contact-blocks *g g'* on the inner face of the shell, circuit-closers *e e'*, carried by the magnets J at their inner ends, wires *h i*, connect-  
40 ing the battery K with the blocks *g g'* and the closers *e*, and water-proof caps *d*, covering the outer ends of the magnets, substantially as and for the purpose set forth.

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Witnesses:

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