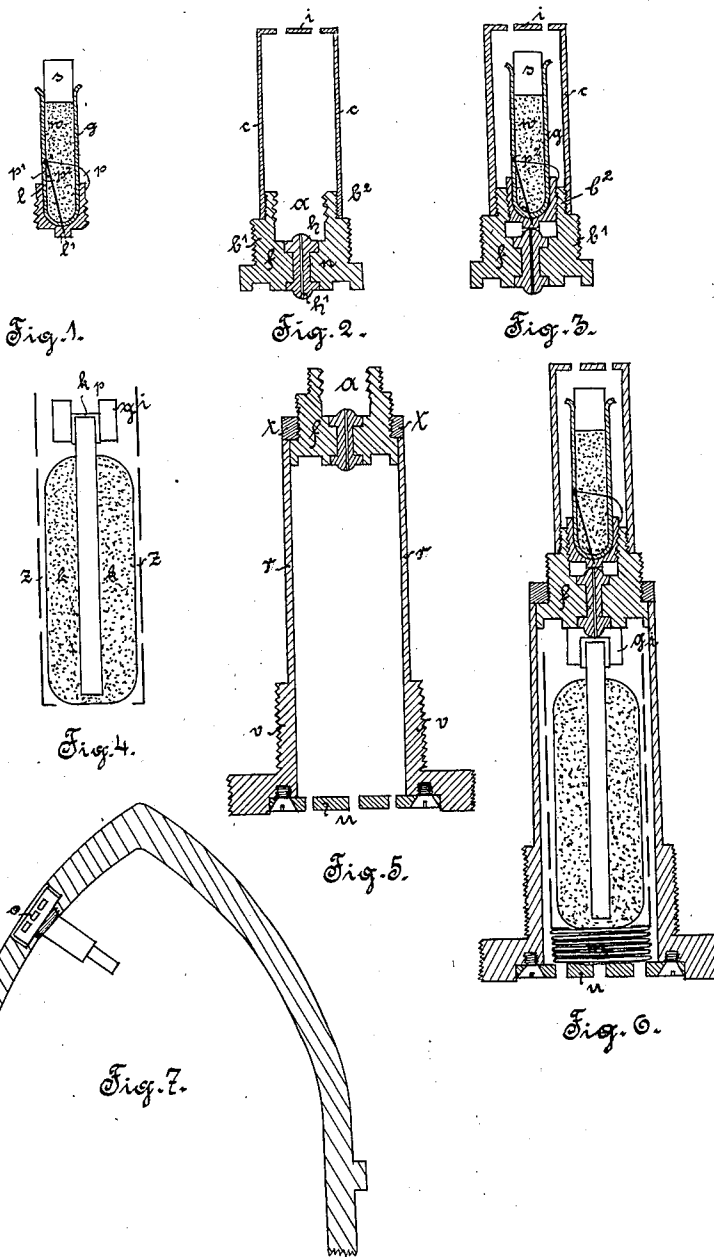


P. SCHWENKE.
ELECTRIC IGNITER FOR EXPLOSIVE SHELLS.
APPLICATION FILED JULY 23, 1908.

952,760.

Patented Mar. 22, 1910.



Witnesses:
With. App. H. H. H.
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UNITED STATES PATENT OFFICE.

PAUL SCHWENKE, OF ZERBST, GERMANY.

ELECTRIC IGNITER FOR EXPLOSIVE SHELLS.

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Application filed July 23, 1908. Serial No. 445,017.

To all whom it may concern:

Be it known that I, PAUL SCHWENKE, a subject of the German Emperor, and resident of Zerbst, in Anhalt, Germany, have invented certain new and useful Improvements in Electric Igniters for Explosive Shells, of which the following is a specification.

In many cases it is desirable and even important that explosive shells do burst not only when they hit the mark but also when they touch water and sink therein. Such igniters which impart to a shell the above-mentioned capability, are already known. For instance an igniter is known which effects the ignition of the explosive charge by chemicals which upon entrance of water are ignited. Such igniting is however unreliable as the chemicals, when the igniter has been stored for a long time, are through the admission of air and especially by the moisture in the air easily decomposed and thus useless. Further, electric igniters have already become known which act in such a way that water enters a galvanic element, which is filled with dry material, and thereby excites the element whereupon by the electric current produced a platinum wire arranged in the explosive cartridge is caused to glow. With said known igniters, however, the galvanic battery and the explosive cartridge were separately inserted in the shell. According to the present invention, in such electric igniter the explosive cartridge is to be connected with the galvanic battery to form a homogeneous body which is screwed into the shell.

The accompanying drawing shows central vertical sections through the improved arrangement.

Figure 1 represents the separated explosive cartridge. Fig. 2 the separated guard inclosing the same, Fig. 3 both the latter parts combined, Fig. 4 the separated galvanic battery, Fig. 5 the separated casing, Fig. 6 the whole igniter the cartridge being combined with the battery by the casing, and Fig. 7 part of the shell with the improved igniter.

The igniter comprises the electric explosive carriage, the galvanic igniting element, and the casing to be screwed in the shell and which serves to combine the cartridge and galvanic element.

The electric explosive cartridge (Fig. 1) consists of a tube g of glass or any other

suitable material with one closed and one open end the mouth of said tube being at its edge somewhat bent outward. The tube serves for the reception of priming matter. Through the walls of the tube two platinum wires p, p^1 are passed which form the continuation of the electric circuit. A somewhat thinner platinum wire p^2 which passes across the interior of the tube connects the two platinum wires p, p^1 by its being soldered thereto and serves with closed electric circuit to glow in order to ignite the priming matter surrounding the same. Said glass tube is similar to the glow-lamps fixed by plaster of paris with its bottom in a glow-lamp socket l with Edison-threads, to which the two platinum wires p, p^1 are soldered, one p terminating in the upper socket edge l and the other p^1 in the non-conducting foot f of the socket—just as this is known with glow-lamps. By this arrangement the electric explosive cartridge can be easily screwed into its brass guard c (Fig. 2), the foot f of said guard being provided with internal Edison-threads a to receive said cartridge. Through a central boring of said foot which for isolation is fitted with vulcanized india-rubber n passes a metal pin h^1 which carries a small head h , said pin effecting the electric connection between the platinum wire p^1 and the carbon pole kp (Fig. 4) of the galvanic element. The foot f is provided with two steps b^1, b^2 which are both provided with screw-threads. On the step b^2 the guard proper c is screwed over the electric explosive cartridge, the size of the guard being adapted to that of the cartridge. At the top i the guard is closed but provided with several holes for the passage of the sparks produced by the cartridge when exploding. The thicker step b^1 of the foot f serves with its screw-threads for screwing the cartridge into the casing (Figs. 5 and 6) described below.

The galvanic igniting element (Fig. 4) consists of a zinc pipe z which is open at the top and closed at the bottom and serves for the reception of an appropriate quantity of carbon k which with its metal-covered pole kp projects somewhat above the edge of the zinc pipe the latter forming at the same time the zinc electrode. The walls and bottom of said zinc pipe are provided with a number of small holes through which eventually water can enter the interior of the element. The exciting salts necessary

for a vigorous supply of electric current are contained in the carbon, the latter as well as the interior of the zinc pipe being in normal condition perfectly dry.

5 The casing (Fig. 5) comprises a brass pipe *r* and is closed at one end by a strong soldered bottom, the latter being provided with a screw-threaded boring into which the cartridge (shown in Fig. 3) is firmly
10 screwed with its screw-threaded step *b*¹. The other open end of the pipe *r* shows at its outer part a strong thickened screw-threaded part *v* to screw therewith the finished igniter into the hollow shell and carries at its extremity a screw-threaded flange
15 which in its opening receives the metal plate *u*. The latter closes the open end of the casing and carries perforations through which eventually water can enter to excite the igniting element. The inner space of
20 the casing serves for the reception of the igniting element which is so inserted that its carbon pole can be conducted in a metallic way to the insulated pole—pin *h*¹—of the explosive cartridge which projects into
25 the space of the casing. To insulate said contact point a thick perforated tightening washer *g*¹ lies on the bottom of the casing so as to surround and tighten simultaneously
30 the insulated pole—pin *h*¹—of the explosive cartridge as well as the carbon pole pressing against the same under the influence of a spiral spring *m* which is provided to intervene between the bottom of the zinc
35 pipe *z* and the metal plate *u* so that the contact between the insulated pole of the explosive cartridge—pin *h*¹—and the carbon pole of the igniting element cannot lose its intimate connection. The spiral spring
40 constituting a metallic conduct between zinc pipe and casing, a closed electric circuit is always formed between the igniting element and cartridge as the latter is also in metallic connection with the casing through
45 their Edison-threads.

The finished igniter (shown in Fig. 6) is with its screw-threads *v* screwed into a corresponding screw-threaded opening *o* in the shell preferably in proximity to the head of

the latter (Fig. 7). Upon the shell being 50 shot by a gun into the sea and as soon as it reaches the water and sinks, water enters the igniter through the opening in the metal plate *u* and penetrates through the openings in the zinc pipe and the carbon in the latter, 55 whereby the element is excited to produce an electric current of sufficient intensity to glow the thin platinum wire *p*² thus effecting explosion of the priming matter which by its sparks brings the shell to detonation. 60 To store the igniter for a longer time, the same may be enveloped in tin-foil, it being not screwed into the shell but shortly before its intended use.

Having fully described my invention, what 65 I claim and desire to secure by Letters Patent is:—

1. An electric igniter for explosive shells adapted to be operated when touching water, comprising in combination with the 70 shell, an electric explosive cartridge, a galvanic element adapted to be excited by the entrance of water, and a casing containing both the battery and the igniter and designed to be screwed into the shell, the battery, the igniter, and the casing being so 75 combined as to present always a closed circuit, as described.

2. An electric igniter for explosive shells adapted to be operated when touching water, comprising in combination with the 80 shell, an electric explosive cartridge, a galvanic element designed to be excited by the entrance of water, a casing designed to be screwed into said shell and to connect said 85 cartridge and element, and a glow-lamp socket to effect the connection between said cartridge and casing, the whole arrangement being so combined as to present always a closed electric circuit, all for the purpose set 90 forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

PAUL SCHWENKE.

Witnesses:

A. MÜLLER,
P. BROWN.