H. J. SMITH

Torpedo for Oil Wells.

No. 107,201. Patented Sept. 6, 1870.

Fig. 1

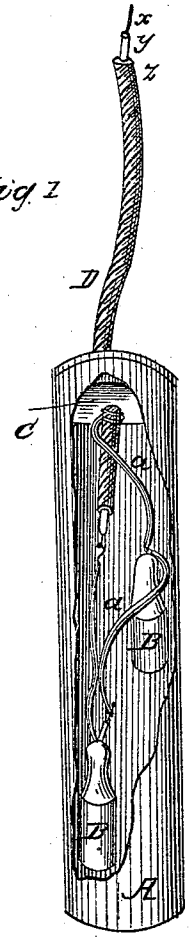
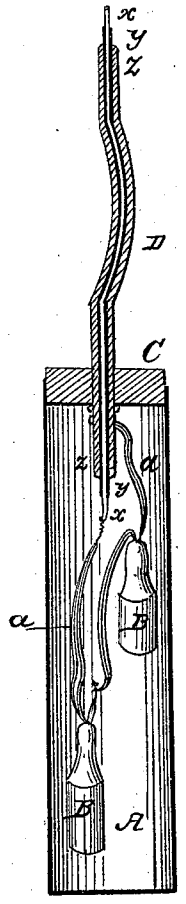


Fig. 2



Witnesses
William W. Swan
W. H. Jackson

Inventor
H. Julius Smith

UNITED STATES PATENT OFFICE.

HENRY JULIUS SMITH, OF BOSTON, MASSACHUSETTS.

IMPROVEMENT IN TORPEDOES FOR OIL-WELLS.

Specification forming part of Letters Patent No. **107,201**, dated September 6, 1870.

To all whom it may concern:

Be it known that I, HENRY JULIUS SMITH, of Boston, in the State of Massachusetts, have invented a new and useful Improvement for Exploding Torpedoes in Oil-Wells.

I proceed to describe the same, making reference to the accompanying drawing, in which—

Figure 1 is a perspective view of a torpedo prepared for explosion, with the shell of the torpedo broken to show certain connections hereinafter explained. Fig. 2 is a sectional view of a torpedo so prepared.

In exploding torpedoes in oil-wells by means of electricity, which is the safest way of exploding them, insulated conductors must be employed to connect the electrical machine or battery with the torpedo at the bottom of the well. The conductors at present in use are small copper wires covered with gutta-percha. Sometimes two wires are used, the circuit being broken in the fuse of the torpedo, and sometimes one wire is used, the return-circuit being completed through the water and earth, a wire connecting the fuse with the outside of the torpedo, and another connecting the electrical machine with the earth. But, whether one conductor is employed, or two, there are certain disadvantages attending the use of electricity, which it is the object of this invention to overcome.

When the torpedo is discharged a great part of its force is exerted upward, and, of course, in a line with the conductors, which extend from the top of the well to the bottom. Water, oil, gases, pieces of the torpedo itself, and whatever else there may be in the well, are thrown violently up, and, being confined within the small bore of the well, must necessarily, as they rush along, have no little effect upon the conductors. The wires are almost entirely stripped of their insulating covering, and it is also found that the wires are broken into small pieces, the latter effect being probably caused by the violent tearing away of the gutta-percha. The strips of gutta-percha and the fragments of wire cause serious trouble to the pumps of the well by getting into the boxes. The loss of insulated wire, too, is a large item in the expense of the blast.

By making use of the combination now to be described there is little or no loss of wire, and the proper action of the pumps is not disturbed.

In the drawing, A is a torpedo. B B are discharges or fuses within the torpedo. C is the tamping, and D is a conductor, consisting of an ordinary insulated wire, protected by a shield or armor. The insulated wire is marked *x* in the drawing.

I use a No. 24 copper wire, it being better to use a small wire, since the invention is designed more especially for static electricity, and it being, therefore, desirable to have as small a surface as possible to be charged.

The insulating covering is marked *y*. The armor is marked *z*. It is formed by coiling small wires about the insulated wire, as shown. I prefer steel wires, as giving greater strength.

The conductor differs from the cable used for ocean telegraphy in not having an outer protecting-casing. Such a casing would be stripped off in the same manner that the gutta-percha is torn from the ordinary insulated conductor. At each end of the conductor D the inner wire projects a little beyond the insulating covering, and the armor does not extend quite to the end of the insulating covering, as shown, in order that there may be no electrical communication between the inner wire and the armor. The conductor D is connected with the torpedo through the tamping, as shown.

a a are wires within the torpedo, insulated, but uncovered and brought into close proximity within the fuses. One of the wires *a* is connected with the inner wire of the conductor D, and the other with the armor, as shown.

At the extremity, without the torpedo, at or near the top of the well, the wire *x* of the conductor is connected with one of the insulated wires leading from the electrical machine, and the armor with the other.

In practice, the conductor D is connected with the torpedo when the latter is charged with its explosive compound, and is connected with the machine-wires after the torpedo is lowered into the well.

Instead of completing the circuit by the use of the armor, as above, a second insulated wire might be put within the armor for that purpose; or one of the wires *a* might be connected with the shell of the torpedo, and one

of the machine-wires connected with the earth, and the circuit completed through the earth, as in telegraphing.

The fuse is burst and the torpedo exploded by the spark produced when the circuit is broken in the fuse.

The use of the wire armor in my combination is not analogous to its use in the combination made up of a submarine cable and the instrument in which the circuit is broken to give a signal. In the latter combination the armor only guards the insulated conductors from dangers from without, while in my combination it is used as a protection against dangers existing within the combination itself. Its principal office is not to protect the conductor from breaking where, by the force of the blast, it is driven against projections or seams, which there may be in the bore of the well. Even my cable may be so broken; but it is to protect it from an additional breaking, occasioned by the act of suddenly stripping the insulating covering from the conductor. That there is such an additional breaking so caused is evident from the fact that large wire, properly insulated, and of a lifting-strength equal to that of the cable, is broken up, in blasting, into nearly as many pieces as the small wire in common use.

If a cable is broken by projections or seams, as aforesaid, the pieces will be of such a length that they will not get into the boxes of the pump, but, on the contrary, can generally be fished up and spliced together, so that there is no loss, whereas a large insulated wire of equal lifting-strength will be so broken as to injure the pumps and be wholly lost.

With a torpedo of the requisite power it will generally be found necessary to use cable-wire from the top to the bottom of the well.

I claim—

An apparatus for producing an explosion in oil-wells, the same consisting of a torpedo united to an insulated wire covered with a protecting armor, as and for the purpose specified.

The above specification of my said invention signed and witnessed at Boston this 24th day of January, A. D. 1870.

H. JULIUS SMITH.

Witnesses:

WILLIAM W. SWAN,

W. W. JACKSON.