

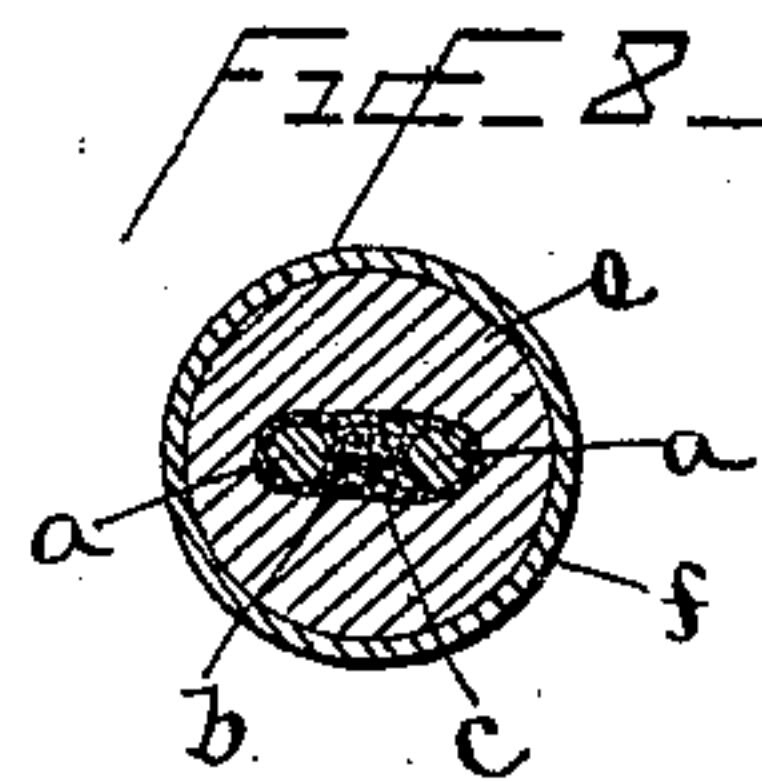
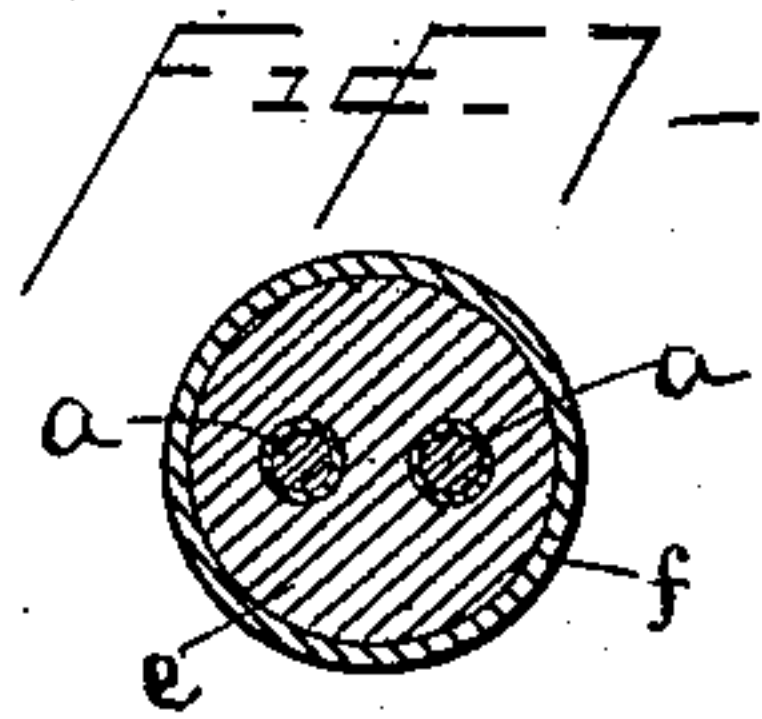
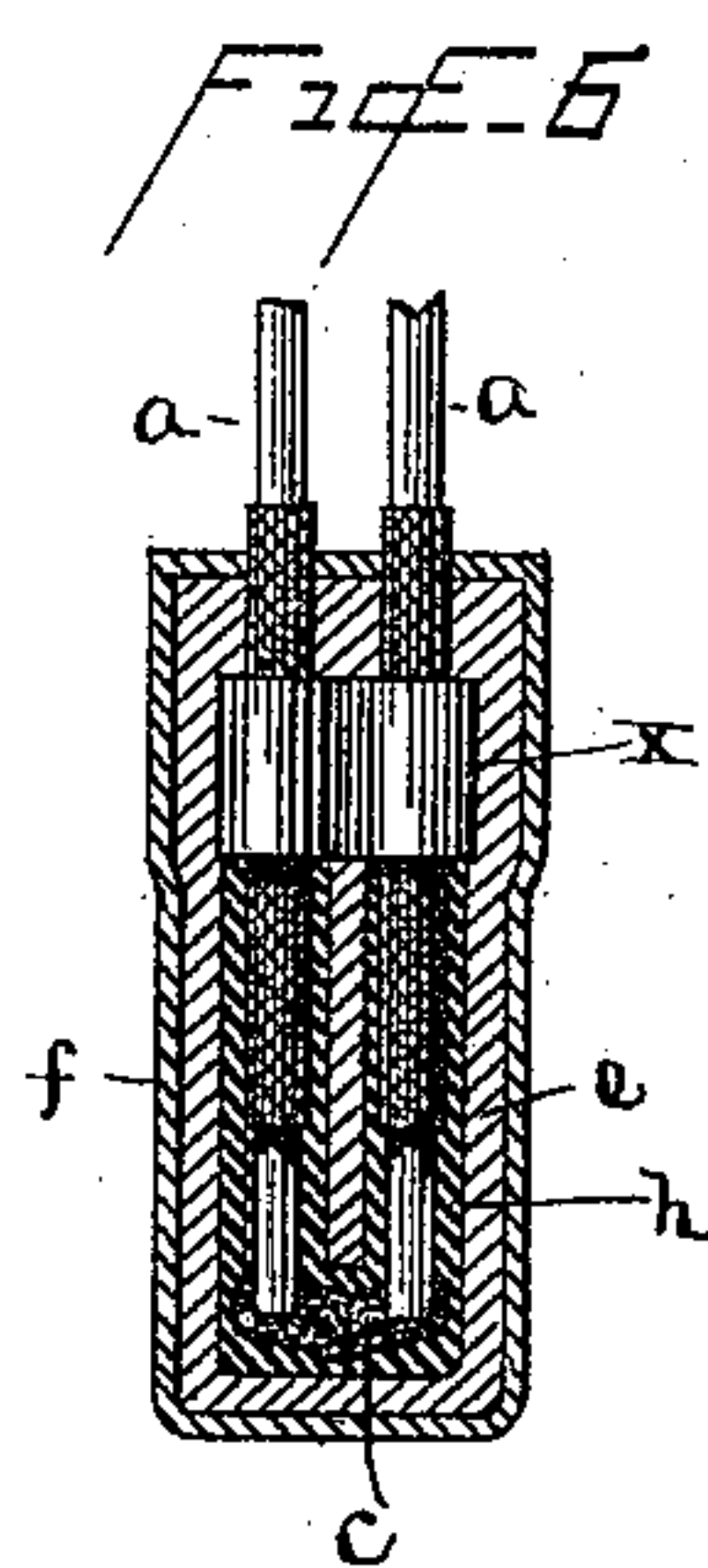
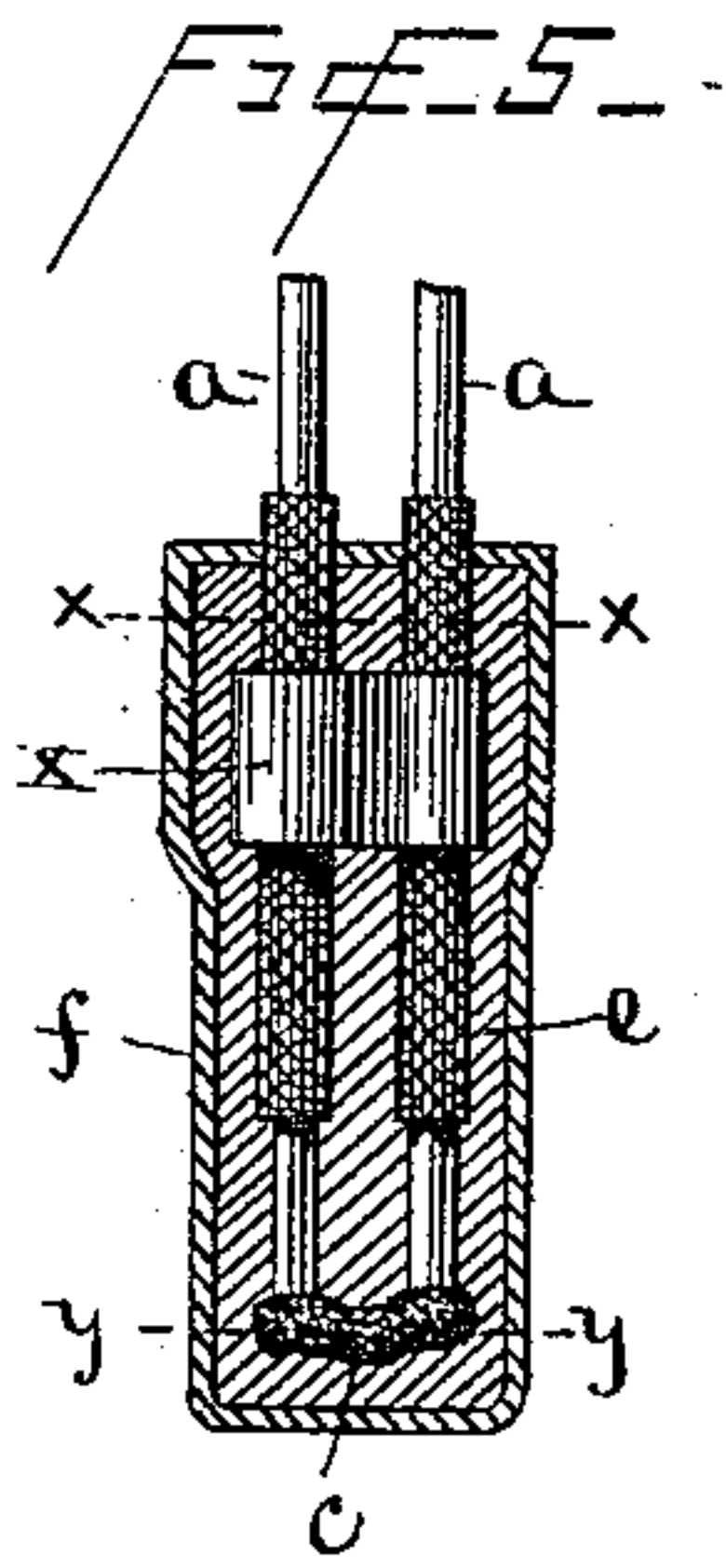
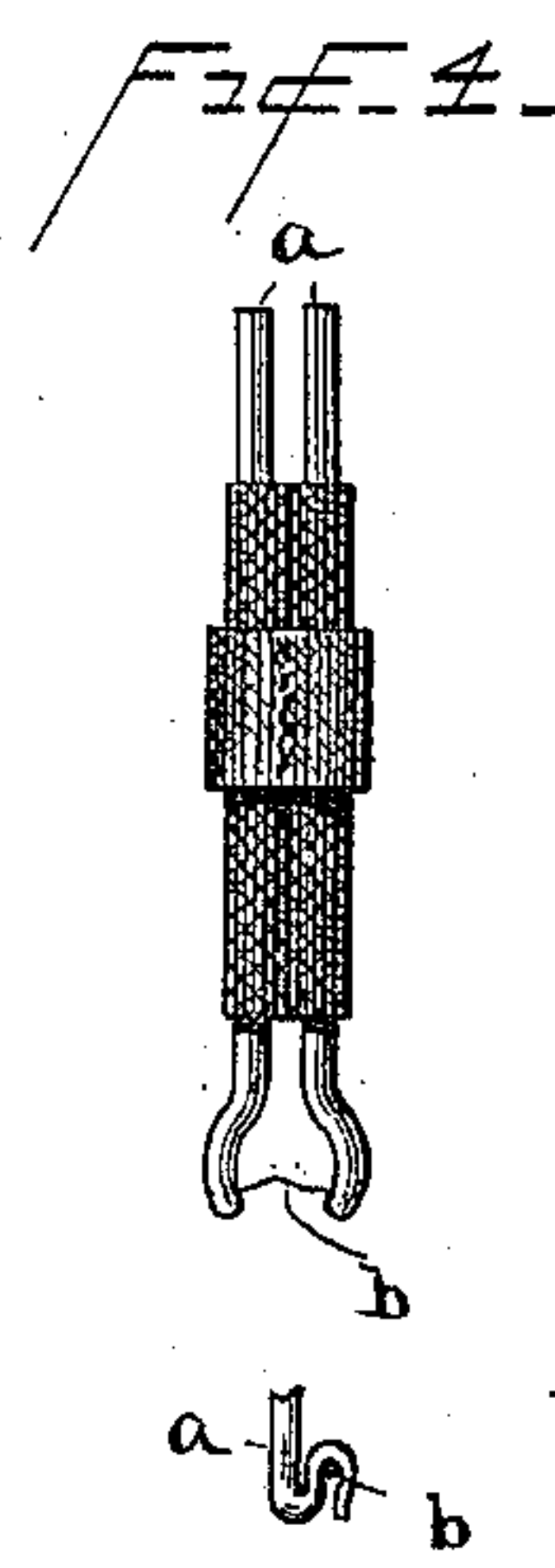
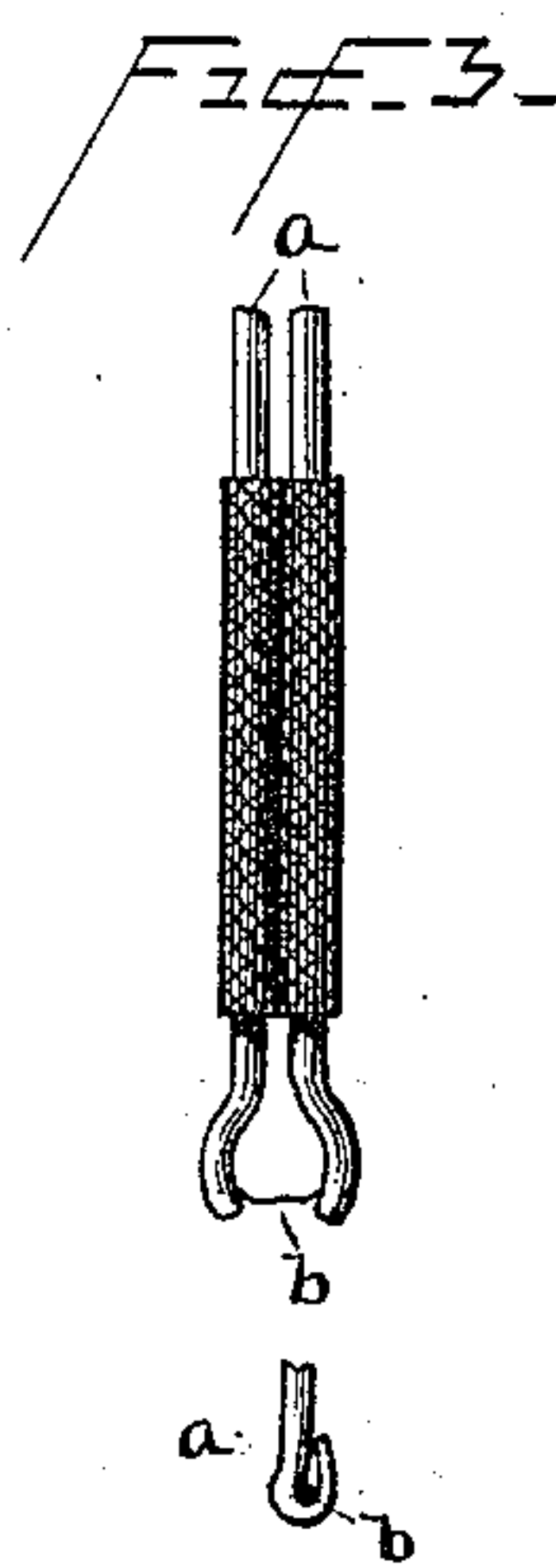
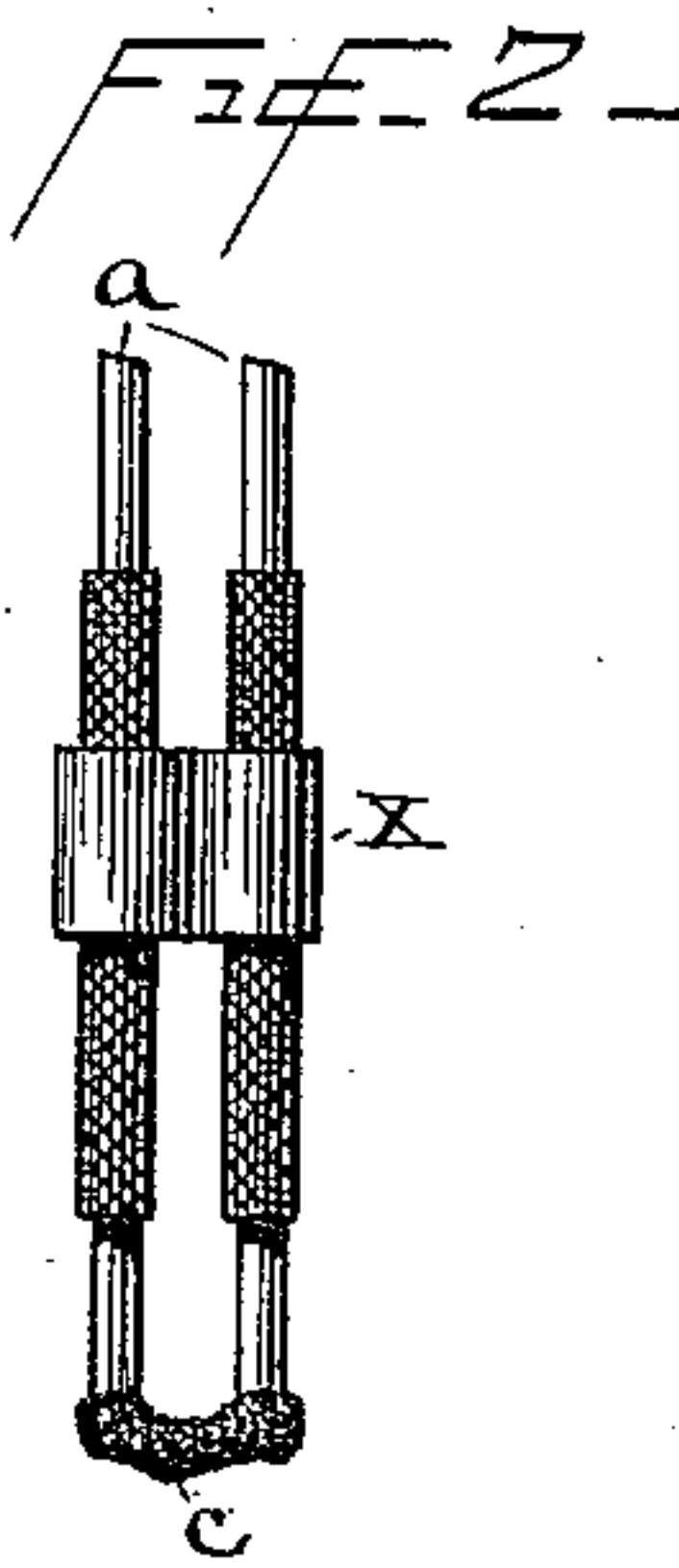
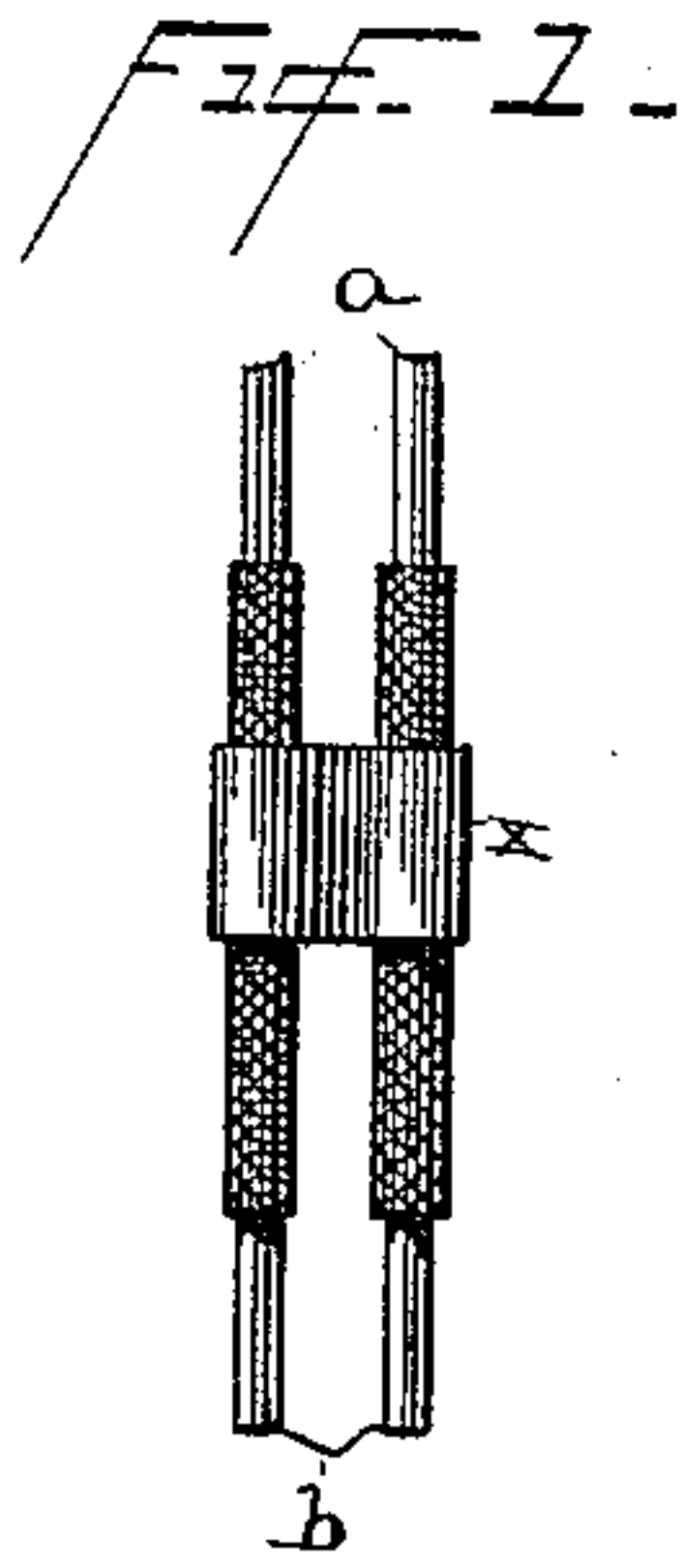
(No Model.)

E. L. ZALINSKI & H. J. SMITH.

ELECTRICAL PRIMER.

No. 405,646.

Patented June 18, 1889.



WITNESSES.

Norris A. Clark,

L. M. Bartlett.

INVENTORS

Edmund L. Zalinski

H. Julius Smith.

By W. A. Bartlett

Atty

UNITED STATES PATENT OFFICE.

EDMUND L. ZALINSKI, OF THE UNITED STATES ARMY, AND HENRY JULIUS SMITH, OF POMPTON, NEW JERSEY.

ELECTRICAL PRIMER.

SPECIFICATION forming part of Letters Patent No. 405,646, dated June 18, 1889.

Application filed November 13, 1888. Serial No. 290,682. (No model.)

To all whom it may concern:

Be it known that we, EDMUND L. ZALINSKI of the United States Army, stationed at Fort Hamilton, New York, and HENRY JULIUS SMITH, residing at Pompton, in the county of Passaic and State of New Jersey, have invented certain new and useful Improvements in Electrical Primers or Ignitors, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to electric primers for use in mining, blasting, gunnery, torpedo service, &c.

The invention consists in the construction and combination of parts constituting the primer.

Figure 1 indicates a form of electric primer consisting of two conducting-wires, their retaining-clip, and the platinum bridge, well known in the art. Fig. 2 is the same, with the platinum bridge embedded in an explosive compound. Fig. 3 is an elevation and detail of the primer, with a covering of non-conducting material secured by stitching. Fig. 4 is an elevation and detail similar to Fig. 3, with external covering secured by stitching, a textile or fibrous retaining-piece about the same. Fig. 5 is a longitudinal section of the primer, covered with a supporting and inclosing piece, and a covering of wax, rubber, or other waterproofing substance. Fig. 6 is a section of the primer, with the bridge and surrounding explodent covered with a waterproofing material and embedded in a supporting-piece. Fig. 7 is a section on line *xx*. Fig. 8 is a section on line *yy*, Fig. 5.

As commonly constructed, electric wires are connected with an incased and explosive detonator, and in such condition are shipped. This makes a package which is dangerous or objectionable to handle. In the improved construction the primer or ignitor is made complete for transportation and ready attachment to the detonator. The detonator most in use is a metallic tube closed at one end and having an explosive charge of fulminate of mercury in the closed end, the other end being left open for the insertion of the primer. In blasting, the primer-detonator is inserted in the blasting-charge, the wires of the primer connected to an electric battery, and the ex-

plosion is caused by passing the electric current through the wires and their bridge.

In Figs. 1 and 2 of the drawings the insulated electrical conducting-wires *a a* are held together near the end by the clip *x*, or by sewing through the insulated covering, or in any other suitable manner. The ends are separated for a little distance, and are connected by a platinum bridge *b*. The platinum bridges are composed of wire of the same length and diameter, so that the passage of a given electrical current through a large number of connected primers will bring all the bridges to a temperature sufficient to ignite the priming-charge at the same instant. The ends of the wires *a a* and bridge *b* are covered by an igniting-charge of exploding material. This material is preferably gun-cotton or fulminate of mercury, but any equivalent may be used. The explosive coating must be uniformly adherent, so that the passage of an electrical current shall produce a like increase of temperature on a large number of connected bridges, and ignite all the primers simultaneously. After the bridge *b* is covered with explosive material the whole is inclosed in a cylindrical or other formed solid piece *e*, which is preferably cast around the bridge and wires. This piece *e* may be of sulphur, which is melted and poured around the primer and permitted to cool; but the piece *e* may be of metal, plaster, papier-maché, paper-pulp, or any other material which will be solid and firm when set. In this condition the ignitors or primers are ready for transportation and use; but the device is improved by a coating of wax *f*, which renders the primer water-proof, and also serves to attach it firmly to a detonator whenever it is desirable to put the primer into use. When the waxed piece is inserted in a detonator, the wax serves to attach the ignitor to the detonator, and excludes all moisture, protecting the primer from atmospheric influences.

For certain purposes it is advisable to cover the bridge and its explodent with a water-proof material *h* before inclosing in the sulphur or plaster. (See Fig. 6.) This water-proof coating, of rubber, gutta-percha, varnish, or the like, can be applied by dipping

the wires and their attached bridge and explosive covering into a bath of the fluid material, or otherwise.

For submarine purposes the entire primer or ignitor may be covered with rubber or similar material, instead of the wax *f*.

The advantages of these ignitors are that they are perfectly safe in handling, and may be made to endure changes of climate, temperature, and moisture. The exploding-charge on each bridge is so small that one ignitor of a package may be fired without firing the others, yet the charge is ample for igniting the well-known commercial detonator.

By separating the ignitor from the detonator we produce a commercial article which is safe to transport. The separate detonators are well known and procurable in any mining region.

The platinum bridges may be attached to the conducting-wires by passing through hooks at the ends of the wires, said hooks being flattened down on the bridge, which is preferably soldered to the wires. The conducting-wires may be connected by sewing together the textile covering of the wires.

We claim—

1. An electrical primer consisting of the conducting-wires and a bridge, an explosive surrounding the bridge, and a solid non-explosive piece inclosing and supporting said bridge and its attached priming, substantially as described.

2. In an electrical primer, the combination

of the conducting-wires, the bridge, an explosive surrounding the bridge, a solid surrounding and supporting piece of non-explosive material adapted to fit the commercial detonator, and an adherent covering therefor, substantially as described.

3. The conducting-wires having a non-conducting textile covering connected by stitches passing through the textile covering between the wires near the bridge, combined with the platinum bridge connecting the terminals of said wires, all combined substantially as described.

4. In an electrical primer, the conducting-wires, bridge surrounded by explosive material, a water-proof covering for said bridge and coating, and an incasing-piece of non-explosive material cast or molded thereon and shaped to fit the commercial detonator, substantially as set forth.

5. In an electrical primer, the combination of the conducting-wires, the bridge and its igniting-priming, the inclosing solid supporting-piece of non-explosive material, and a waterproofing and adherent covering for the exterior of the said piece, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

EDMUND L. ZALINSKI.
HENRY JULIUS SMITH.

Witnesses:

VICTOR E. BURKE,
W. A. BARTLETT.