(No Model.)

J. N. & H. J. HARRISON.

ELECTRODE FOR FIRING EXPLOSIVES.

No. 502,965. Patented Aug. 8, 1893.

Fig. 1.

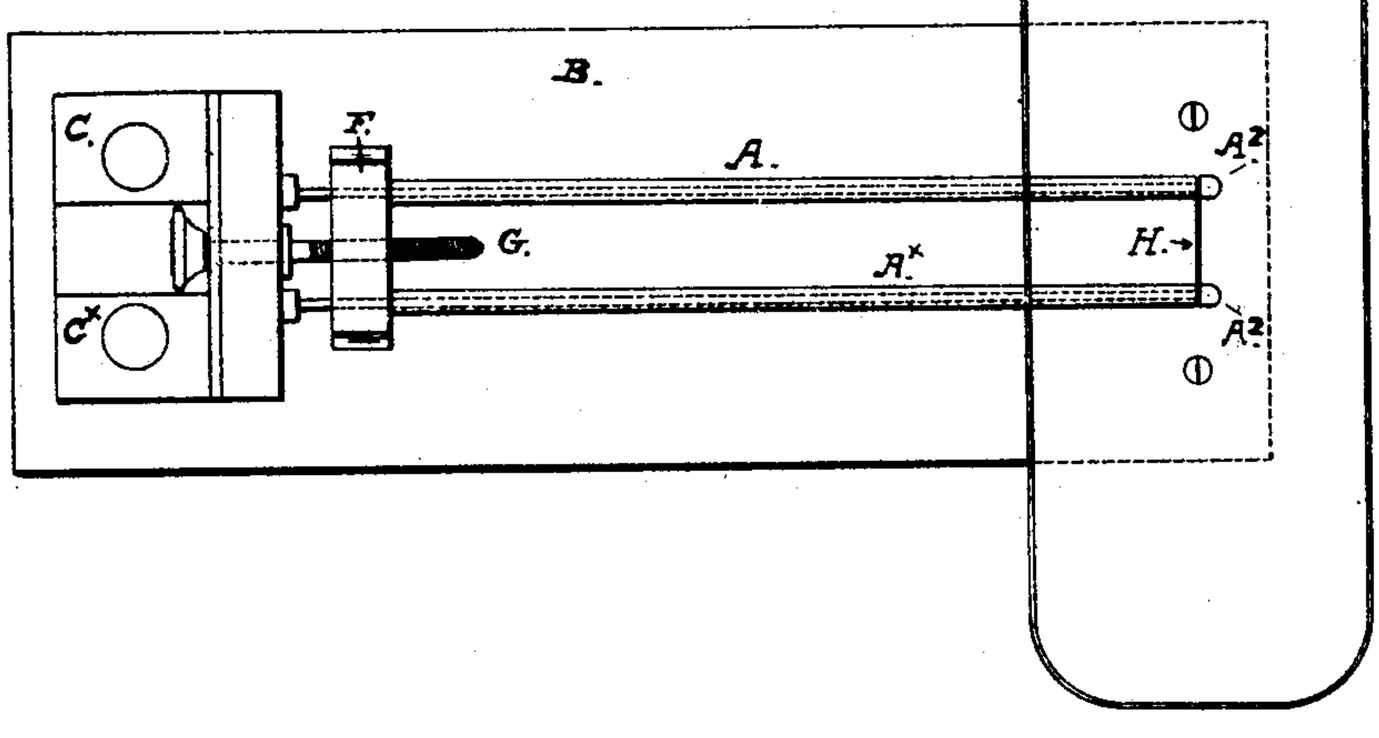


Fig. 2.

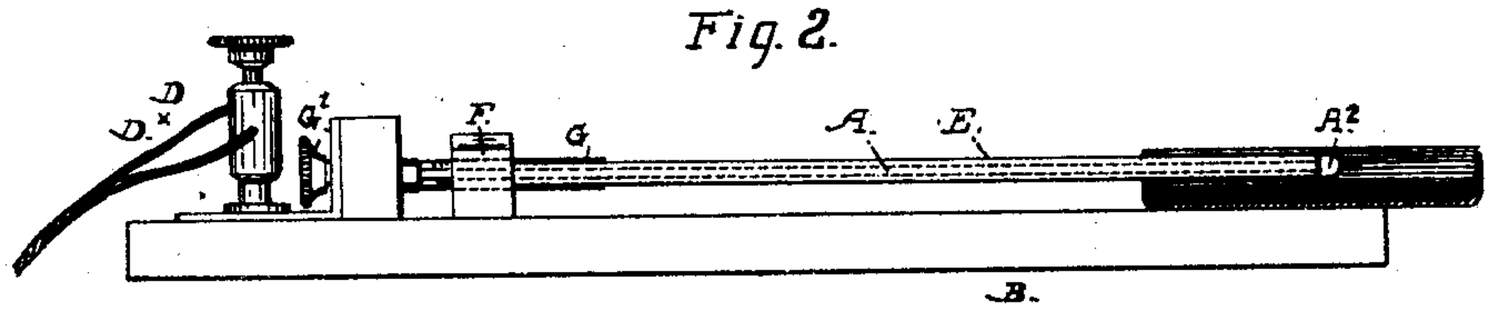
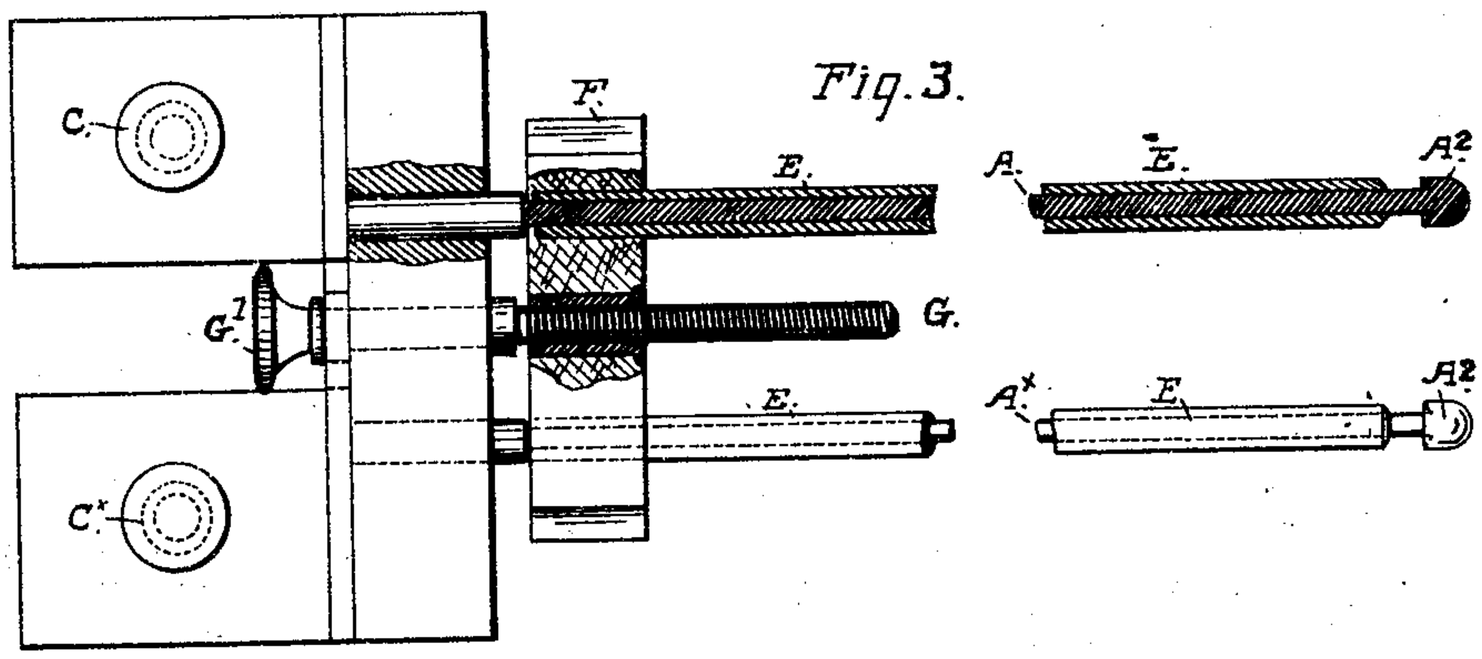


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOSEPH N. HARRISON AND HENRY J. HARRISON, OF SAN FRANCISCO, CALIFORNIA.

ELECTRODE FOR FIRING EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 502,965, dated August 8, 1893.

Application filed June 8, 1892. Serial No. 435,972. (No model.)

To all whom it may concern:

Be it known that we, JOSEPH N. HARRISON and HENRY J. HARRISON, citizens of the United States, residing in the city and county of San Francisco, State of California, have invented certain new and useful Improvements in Electrodes for Firing Explosives and Combustible Mixtures, of which the following is a specification.

Our invention relates to an improvement in electric firing apparatus for setting off explosive mixtures or combustible compounds in the various arts; and the improvement consists of electrodes of novel construction and a clamping device or means to connect to the points of the electrodes a piece of combustible wire or metal such as platinum as hereinafter fully set forth.

The nature of the said invention and the manner in which we proceed to construct and carry out the same will be understood from the following description and accompanying drawings that form part of this specification.

Figure 1 is a top view of a device for fixing flash light powders and other combustible mixtures constructed according to our invention. Fig. 2 is a side elevation of the same, with the pan shown in section. Fig. 3 is a top view in detail on an enlarged scale of the electrodes; parts being broken away and represented in longitudinal section to show the construction.

A $A^{\times}$ are two electrodes formed of metal rods and mounted on a base B for greater convenience in setting and handling.

C $C^{\times}$ are binding posts or screws for attaching to the ends of the rods the conducting wires D $D^{\times}$ from the battery, one rod being connected in this manner with the positive side and the other rod with the negative side of the battery. On the point or unattached end of each rod is formed a head A^2 by turning off the metal until the rod is suitably reduced in diameter back of the point to form a head or enlarged tip with a square shoulder, or by forming the head or tip separately and fixing it on the rod.

E is a tube or sleeve of metal with a sliding fit on the rod and with a square end to set up against the shoulder formed by the back of the enlarged end or tip of the rods.

F is a sliding cross-bar, to which is fixed the ends of the two sleeves so that both are conveniently moved and set together by a simple movement of the cross-bar. As a means to move and set the cross-bar we arrange a screw-rod G on the base between the two rods A $A^{\times}$ to work through the cross-bar. The screw threaded rod turns in a socket in the base-plate and is furnished with a milled head G'.

In setting the electrodes for operation, the sleeves are moved back on the rod sufficiently to admit the ends of a piece of platinum wire H between the ends of the sleeves and the heads or tips of the rods, after which the sleeves are set forward to clamp and grip the wire. When the connection is made the points of the two electrodes are joined electrically and the wire thus bridging or connecting one terminal with the other will be fused by the current when the circuit is closed through the battery. The two sleeves or movable parts of the clamps are set up at the same time by turning the screw and are moved much more quickly and easily by this means than could be done by a separate adjustment. When the fusing wire is properly set the parts of the clamp are pressed tightly together so that the faces of the clamp are not exposed to the flames and the fumes of the fired mixture but are kept bright and clean to insure perfect electric contact between the metal and the firing wire. Solid metal rods of suitable thickness are used for the electrodes to obtain increased resistance in the current.

It will be evident from the foregoing description that the sleeve which is the movable part in the present construction could be stationary or could be the fixed part, while the rod could be movable in the sleeve to bring the clamping head or enlarged end up against the end of the sleeve. This modification would in no wise depart from the spirit of our invention, however, and it would seem to furnish no special advantage or improvement over the construction hereinbefore described. In such case the binding posts or connections for the battery wires would be arranged on the fixed sleeves, and the cross head to operate the movable parts of the clamps would have the rods fixed to it.

Having thus fully described our invention,

what we claim, and desire to secure by Letters Patent, is—

1. In an electric firing device or apparatus, the electrodes, enlarged heads or tips on the outer ends thereof, and sleeves or tubular parts upon said electrodes, and means for operating said sleeves, as and for the purpose set forth.

2. In an electric firing device consisting of electrodes formed of two parallel rods which are terminals of the poles of an electric battery, fixed heads or tips on the adjacent ends of said rods, sliding sleeves or parts on said rods adapted to clamp a fusing wire between the ends and the tips of the electrodes, and means for setting up said parts on the rods, substantially as described.

In testimony that we claim the foregoing we have hereunto set our hands and seals.

JOSEPH N. HARRISON. [L. S.]
HENRY J. HARRISON. [L. S.]

Witnesses to Joseph N. Harrison's signature:

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