

J. B. SAUVE & F. BERNARDI.

ELECTRICAL FUSE SPITTER.

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913,566.

Patented Feb. 23, 1909.

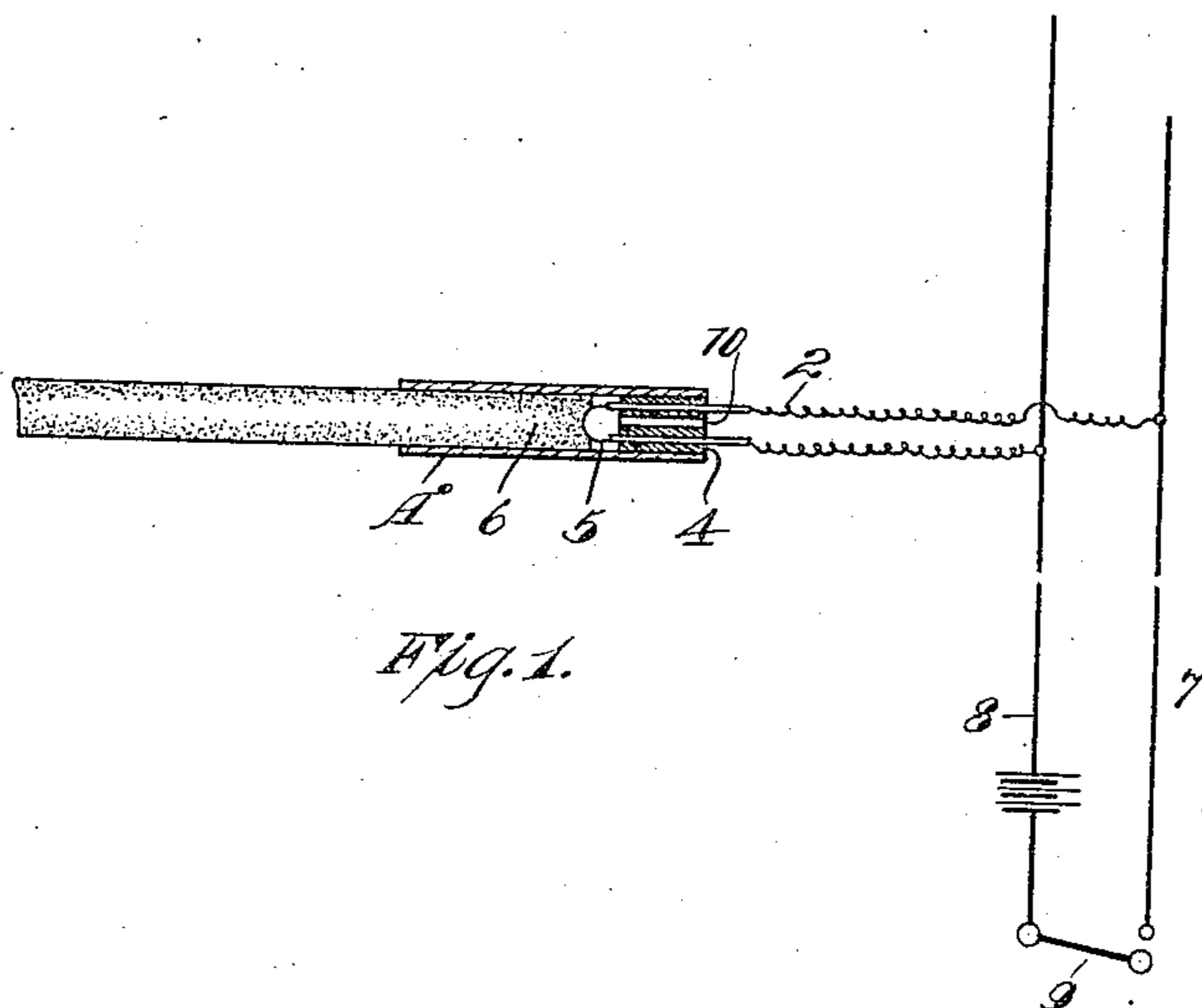


Fig. 1.

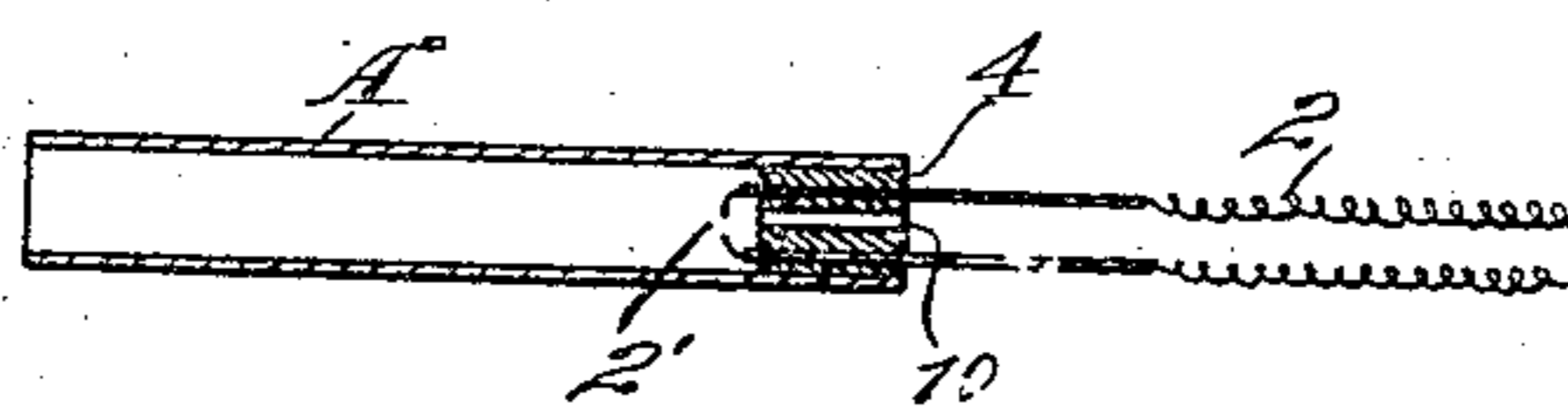


Fig. 2.

WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN B. SAUVE AND FRANK BERNARDI, OF MOKELUMNE HILL, CALIFORNIA.

## ELECTRICAL FUSE-SPITTER.

No. 913,566.

Specification of Letters Patent.

Patented Feb. 23, 1909.

Application filed February 19, 1908. Serial No. 416,744.

*To all whom it may concern:*

Be it known that we, JOHN B. SAUVE and FRANK BERNARDI, both citizens of the United States, residing at Mokelumne Hill, in the county of Calaveras and State of California, have invented new and useful Improvements in Electrical Fuse-Spitters, of which the following is a specification.

Our invention relates to a means for spitting fuses electrically.

In mining and blasting operations it is common to put in one or more blasts, attach a fuse, and light this fuse by means of a candle or match, the miner then having to hasten to some point of safety before the blast goes off. The lighting of the fuse in this manner is called "spitting" the fuse. The fuse must always be long enough so as to enable the man to get out of danger. For example, in mining, if a series of blasts are to be set off in the bottom of the shaft, it is necessary, after lighting or spitting the fuses, for the miner or miners to embark in the cage, and signal those above to hoist. If anything goes wrong with the hoist or with the cage, the workmen in the cage are likely to be killed, and frequent casualties have resulted in this manner.

Our purpose is to provide a simple form of electrical connection for the fuse, which will enable the miner leisurely to proceed to a place of safety, and when everything is in readiness touch off the blast or any number of blasts, either simultaneously or in succession, by simply pressing a button.

The invention consists of the parts and the construction and combination of parts as hereinafter more fully described and claimed, having reference to the accompanying drawings, in which—

Figure 1 is a longitudinal section of the device. Fig. 2 is a similar view of a modified form.

A represents a little tube or cap of suitable size and material. Preferably it is made of sheet-metal, and is just big enough to slip over the end of an ordinary blasting fuse. This cap or tube section is adapted to be slipped on to the fuse, and crimped or clamped thereto by means of pliers or other suitable means. This cap is provided with suitable means for igniting the fuse, either by the formation of an arc or spark, as shown in Fig. 2, or by heating a suitable resistance medium, suitably secured in the cap, to in-

candescence, as shown in Fig. 1. The latter form of construction is preferable.

Where ignition of the fuse is caused by heating the resistance to incandescence, we employ a suitable length of fine wire 2, Fig. 1, preferably of German silver, because of its high resistance; and this wire is looped on itself and inserted into the cap or tube A and secured therein, and preferably insulated from the tube by any suitable means, as a perforated plug 4 of sulfur. The portion of the wire which is looped within the cap, and which part is designed to come in contact with the inflammable end of the fuse 6, is bare. The portions of the wire external to the cap may be insulated, and these free ends of the wire may be of any suitable length. Usually we do not make them over a few inches in length, since they are to connect with the main conductors 7—8 which lead to the switch 9, which latter may be at any suitable point safely removed from where the blasting is to take place. The plug 4 has a vent-hole 10 to permit the smoke and gases, which are formed when the fuse is first ignited, to escape. In practice, we have found that without this vent, the cap would be blown off the end of the fuse, and thereby the fuse would sometimes be put out. Other material than sulfur might be used, but we have found this to work very well in practice.

Where it is necessary to work in damp places, or where there is more or less drip, or where it may be necessary to spit the fuse under water, the little vent 10 may be temporarily plugged with grease or tallow, which will exclude the water, but as soon as the fuse is lighted will be blown out to open the vent.

The end of the tube A, where the insulating material or composition 4 is inserted, is corrugated, or otherwise constructed so as to form such a union with the insulation 4 that the latter will not be easily pulled or blown out.

In practice, a cap A having its conducting wires 2 in place is slipped over a fuse after the blast charge has been put in, and the tube securely crimped to the fuse. The terminals 2 are then connected with the circuit wires 7—8. If there are a number of blasts to be exploded simultaneously, the fuse for each blast is similarly equipped with a cap and the terminals attached to the conductors 7—8; all the fuses being of the same length, so it will take each fuse the same length of time to

burn down to the powder. If it is desired to send off a number of blasts in succession, it is only necessary to cut the fuses in different lengths, and the intervals between the different blasts will be regulated by the difference in time that it takes the several fuses to burn. By simply pressing the button, or closing the switch 9, all the fuses will be spitted simultaneously; but the difference of time between the actual going off of the blasts will be determined as above denoted.

In Fig. 2, is shown a modification in which the spitting is done by the formation of an arc between the two terminals 2' within the cap, similarly as in a jump spark igniting device; the air gap forming the resistance and corresponding to the bared loop portion 5 of Fig. 1.

Having thus described our invention, what we claim and desire to secure by Letters Patent is—

1. A fuse-spitting device consisting of a tubular cap adapted to fit over the end of a fuse, a plug closing one end of the tube, said plug being provided with a vent, and conducting wires passing through the plug and into the cap to a point contiguous to the fuse, and adapted to ignite the fuse on the passage of a current through said wires.

2. A fuse spitting device consisting of a tubular cap adapted to fit a fuse, a solid plug of sulfur closing one end of said cap and having a vent opening through it, and conducting wires passing through the sulfur plug to a point adjacent to the fuse and adapted to ignite the fuse on the passage of a current through said wires.

3. In a fuse spitting device, the combination of a tubular cap, a solid plug of insulating material fixed within one end of the cap, said plug having an opening longitudinally through it for venting the cap rearwardly, and said opening normally closed by a substance which will be blown out when the fuse is lighted, to open the vent, and conducting wires passing through the plug to a point adjacent to the fuse and adapted to ignite the latter on the passage of a current through said wires.

In testimony whereof we have hereunto set our hands in presence of two subscribing witnesses.

JOHN B. SAUVE.  
FRANK BERNARDI.

Witnesses:

CHARLES A. BUFIELD,  
S. H. NOURSE.