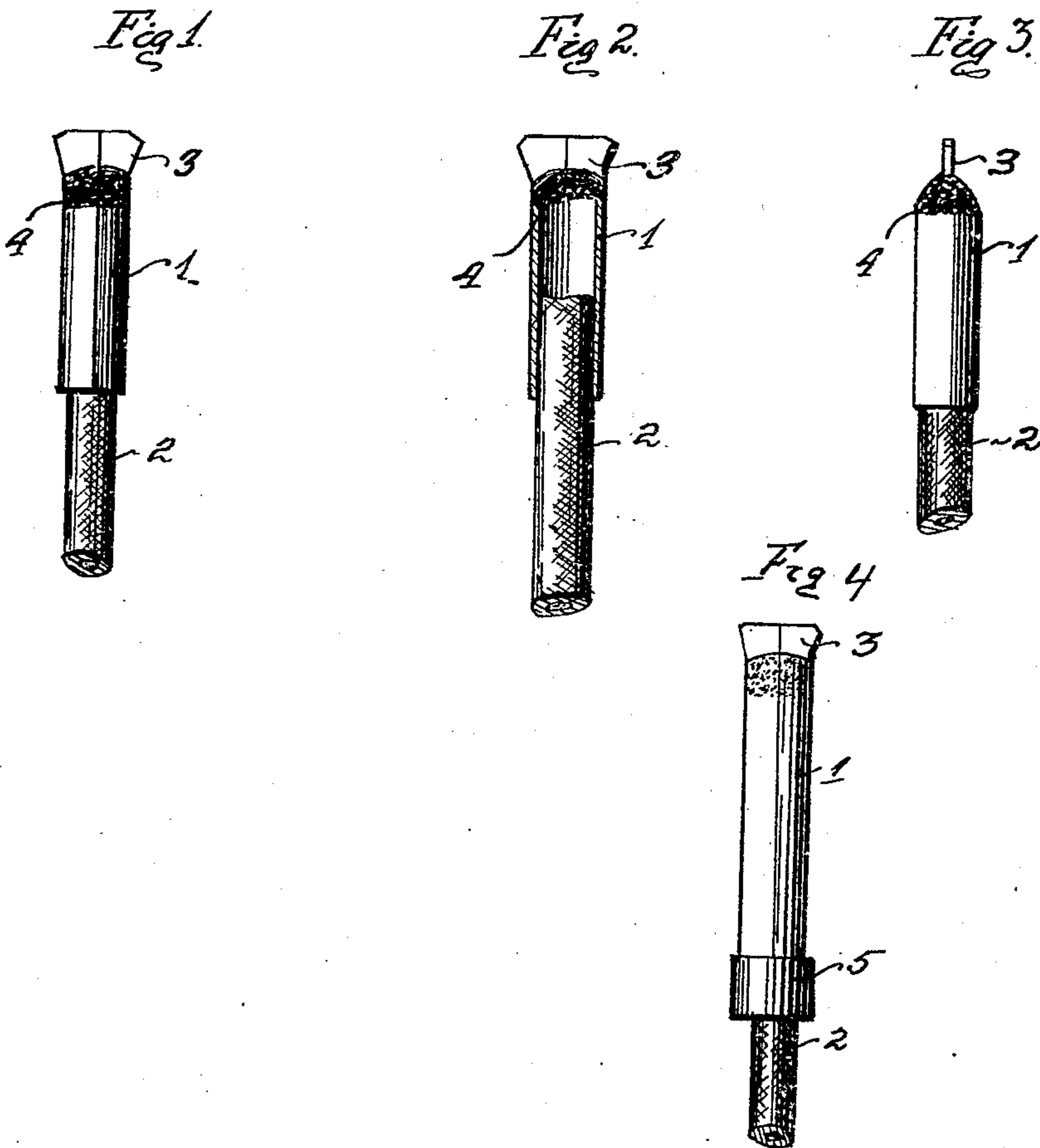


H. BARGMAN.  
FUSE LIGHTER.  
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945,075.

Patented Jan. 4, 1910.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

HARRY BARGMAN, OF LOS ANGELES, CALIFORNIA.

## FUSE-LIGHTER.

945,075.

Specification of Letters Patent.

Patented Jan. 4, 1910.

Application filed April 26, 1909. Serial No. 492,374.

*To all whom it may concern:*

Be it known that I, HARRY BARGMAN, a citizen of Russia, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Fuse-Lighters, of which the following is a specification.

This invention pertains to a fuse lighter, and particularly to an inflammable seal adapted to be placed on the free ends of fuses after the same have been inserted and tamped in the blast holes of mines.

One of the principal objects of this invention is to provide a seal in the form of a cap which when ignited will convey to the powder duct of the fuse for a considerable extent the flame or heat generated by the burning of the cap.

Another object of this invention is to provide a fuse igniter, as distinguished from an ordinary squib, which is safe and reliable, and one that is absolutely unaffected by moisture dampness or water, so that all possibility of the extinguishment of the fuse ends after once lighted is precluded.

It is of common occurrence that after the ignition of the free ends of the fuses in the mines, the seepage extinguishes the lighted ends, and out of a number of fuses that have been lighted, only a few of the same remain lighted until the explosive charge in the bottom of the drilled hole is reached. Under ordinary conditions, in dry mines, the fuse ends are split, and in transportation from one place to another, the exposed powder drops out and recutting or splitting of the fuse ends is necessary. Thus if after the placing of several fuses in the holes of the mines some are lighted and some only seemingly lighted, or some are extinguished by the seepage drippings, it is obvious that the major portion of a day's shift is valueless when it is found that out of a large number of inserted fuses only a few have exploded the charges. Furthermore, re-splitting of a fuse or fuses after the balance of the same have been lighted, is dangerous because of the explosion occurring before the miner has cleared the mine.

A further object of this invention is to provide a seal for the ends of fuses, which is composed of highly inflammable material, is water-proof, and which by reason of its resiliency is capable of confining within its walls an explosive charge, which is adapted to shoot its flame into the duct of the fuse.

With these and other objects in view, this invention consists of the features and details, as will be described in connection with the accompanying drawing, and then be more particularly pointed out in the claims.

In the drawing, Figure 1, is a front elevation of the fuse lighter. Fig. 2, is a side elevation of the same. Fig. 3, is a sectional elevation of the same. Fig. 4, is a front elevation of a cap showing the provision of a crimping ferrule for the bottom of the cap.

Referring specifically to the drawing, 1, designates a cap composed of celluloid or other inflammable substance, said cap being adapted to be fitted over the free end of a fuse 2, and to be held thereon in a secure manner either by crimping or sealing. This cap comprises a strip of celluloid formed in the shape of a tube, and having one end thereof sealed as seen at 3, by pressing together two sides of the tubular body 1, and welding them by pressure and heat in the presence of an adhesive. The cap then has a gradually reduced portion 4, which terminates in the welded extremity 3, of the tubular body. Into this gradually reduced portion of the cap, is inserted in a plastic condition a small charge of powder which contains such ingredients as to make it harden rapidly, so that it becomes a coherent part of the cap. In its plastic condition and by reason of its composition, the powder softens the walls of the cap but for a brief period until absolute desiccation thereof has taken place. When dry it is extremely hard and brittle and under these conditions becomes a unit with the tubular body of celluloid. The provision of a charge of powder within the cap removes the necessity for forcing the igniter upon the free end of the fuse until the powder charge rests upon or contacts with the powder duct or free end of the fuse. The igniter, when combusted, effectually communicates ignition to the powder duct by shooting its blast of flame through the tubular body for a distance of from one to two inches. Consequently the cap may be fitted to the extreme end of the fuse so that a space of one inch may be left between the said end of the fuse and the powder in the cap, without incurring any liability of failure to ignite the powder in the duct. Aside from the chemical action of the powder on the walls of the cap, the inherent resiliency of the walls at the bulging portion is such that a moldable quantity of ex-



plosive material may be inserted without incurring any danger of dislodgment by careless handling.

The cap in its completed form is coupled  
5 with no dangers whatsoever, for neither pressure nor severe shocks are capable of causing a detonation of the same, and the miner may with perfect safety carry about  
10 him any number of the filled caps regardless of conditions, excepting of course those where direct flame is concerned.

It will be noted that the terminus of the cap is extremely thin. This provision is made for the purpose of enabling the same  
15 to be used as a lighting tab, which easily ignites, and quickly communicates the flame or heat engendered to the powder charge, thereby igniting the fuse.

By the provision of the caps on the ends  
20 of the fuses, the spitting of a number of fuses is rendered possible, giving to the miner ample opportunity to escape from the mine prior to the explosion of any of the blasts.

In order to render the bottom of the fuse-  
25 igniter absolutely tight against any possible ingress of water, a sealing medium may be placed at that point, and this sealing medium may be either in the nature of a wax  
30 or a water-proof compound, or the bottom of the cap may be crimped to snugly embrace the fuse. To doubly prevent the entrance of water, I prefer to provide a ferrule 5, shown in Fig. 4, at the bottom of the cap,  
35 which ferrule or ring may be of any suitable material preferably metal.

What I claim, is:

1. A tubular celluloid seal for fuse ends having a lighting tab, provided with a metal  
40 ferrule adapted to be crimped on the fuse.

2. A fuse igniter comprising a tubular body of inflammable waterproof material adapted to fit over and form a seal for the free end of a fuse, said body having confined

within and inseparably united therewith a 45 powder charge.

3. A fuse igniter comprising a tubular body of inflammable waterproof material adapted to fit over and form a seal for the free end of a fuse, said body having confined 50 within a charge of powder chemically united with said tubular body.

4. A fuse igniter comprising a tubular body of inflammable waterproof material sealed at one end to form a lighting tab, and 55 a powder composition within said tubular body and united therewith by chemical action, said powder composition having a higher combustibility than said tubular body whereby said body forms a guide for the 60 flame of combustion of said powder.

5. A fuse igniter comprising a tubular body of inflammable waterproof material adapted to fit over and snugly engage the free end of a fuse, said body having a gradu- 65 ally reduced portion terminating in a flattened lighting tab which forms a seal for the free end of said tubular body, and a powder charge within and united with said gradually reduced portion, said powder charge 70 being in proximity to said tab.

6. A fuse igniter comprising a tubular body of celluloid arranged to snugly engage and form a seal for the free end of a fuse, said tubular body being flattened and sealed 75 at one end to form a lighting tab, and a powder composition within said tubular body and in proximity to said tab, said powder composition being arranged to adhere to and form a part of said tubular 80 body.

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

HARRY BARGMAN.

Witnesses:

H. M. BARSTOW,  
ANTON GLOETZNER, Jr.