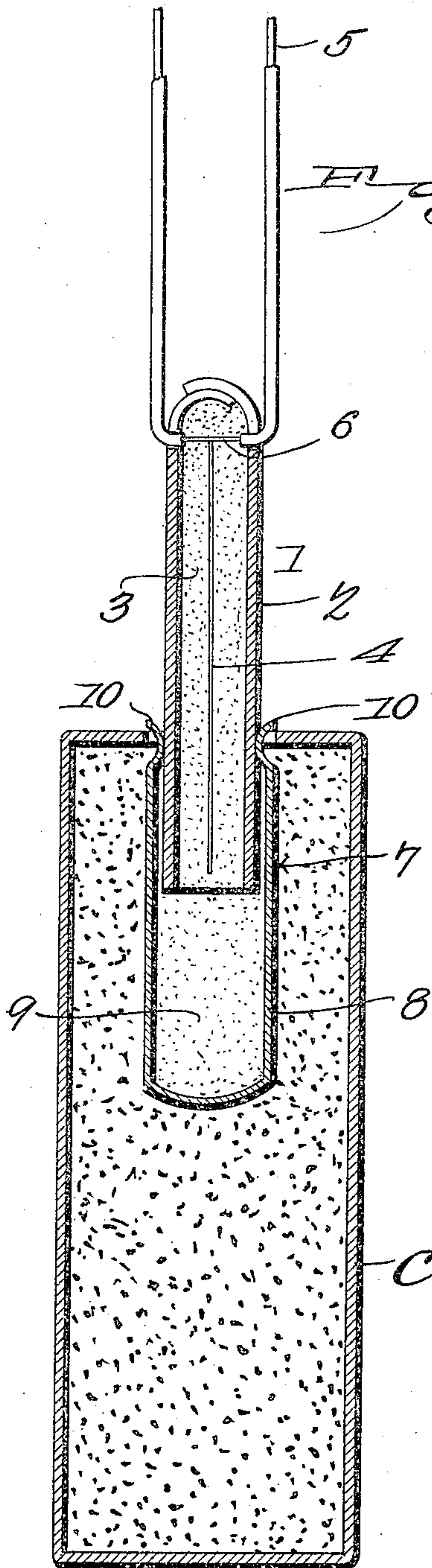


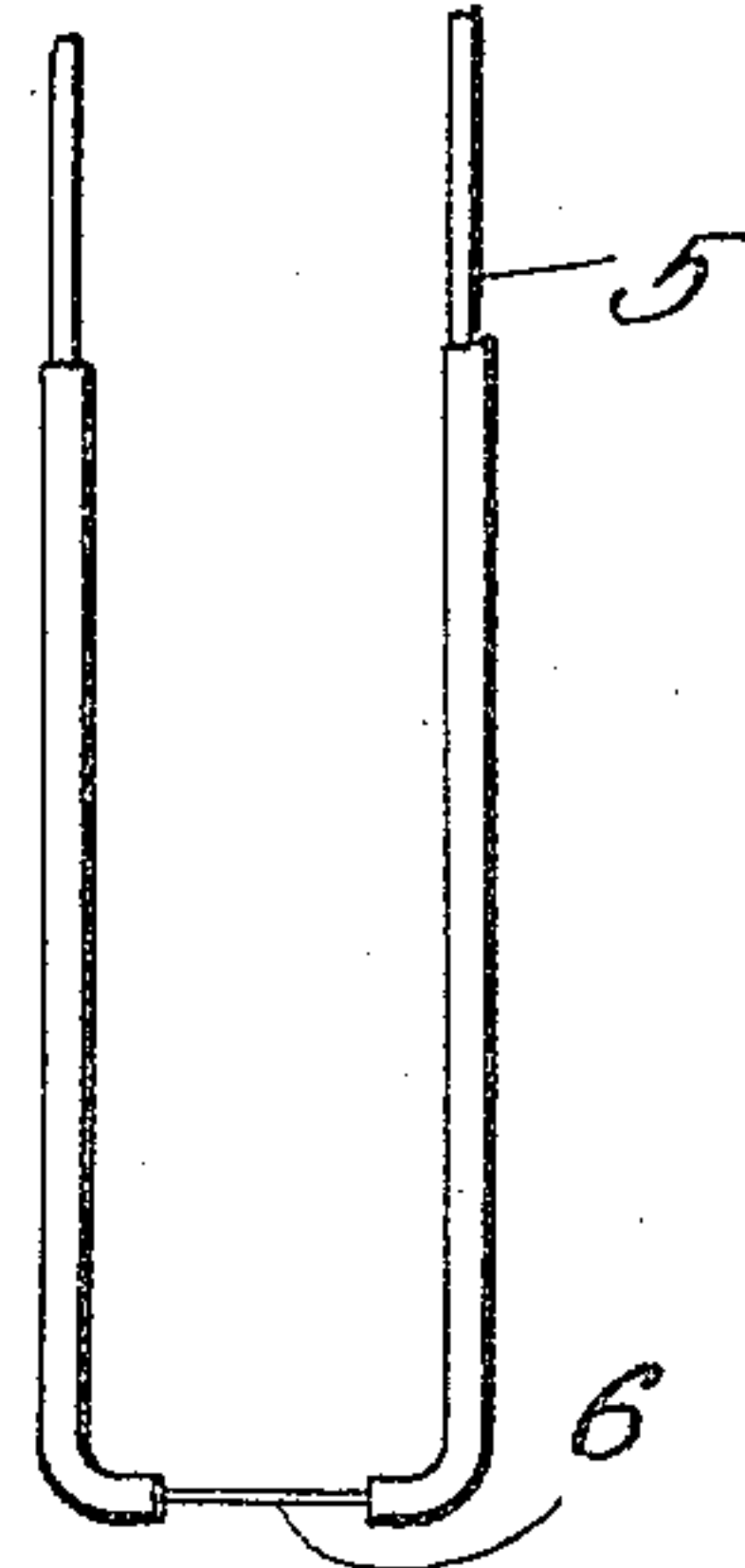
No. 784,226.

PATENTED MAR. 7, 1905.

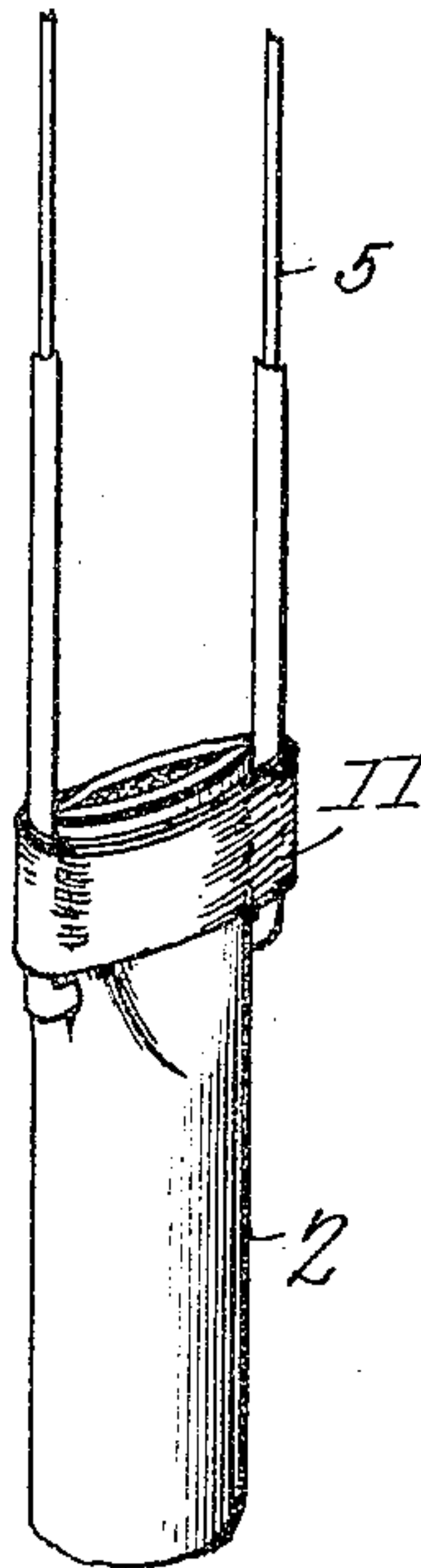
F. M. QUINN.  
ELECTRICAL FUSE PRIMER.  
APPLICATION FILED SEPT. 17, 1903.



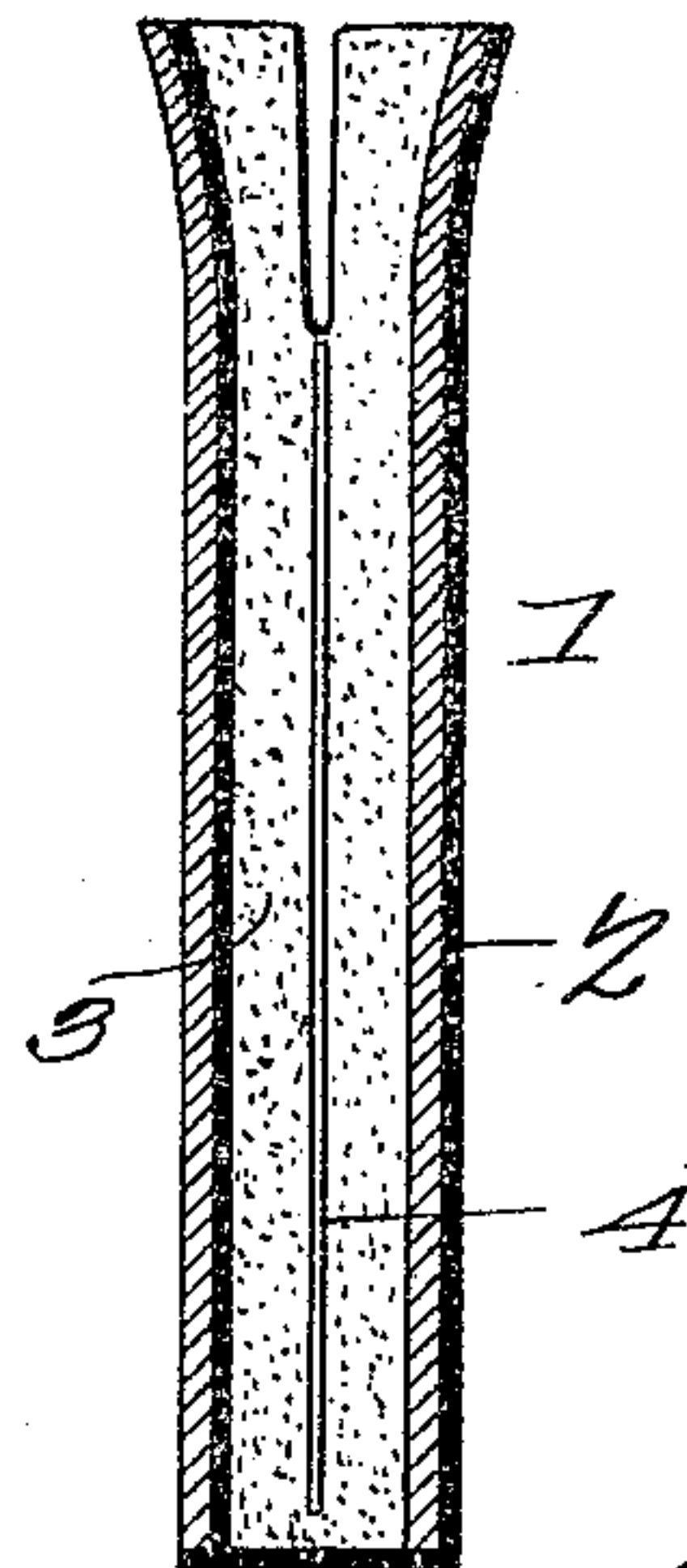
*Fig. 1.*



*Fig. 3.*



*Fig. 4.*



*Fig. 2.*

Witnesses  
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## UNITED STATES PATENT OFFICE.

FRANCIS MICHEL QUINN, OF SILVERKING, IDAHO.

## ELECTRICAL FUSE-PRIMER.

[ SPECIFICATION forming part of Letters Patent No. 784,226, dated March 7, 1905.

Application filed September 17, 1903. Serial No. 173,584.

*To all whom it may concern:*

Be it known that I, FRANCIS MICHEL QUINN, a citizen of the United States, residing at Silverking, in the county of Shoshone and State of Idaho, have invented a new and useful Electrical Fuse-Primer, of which the following is a specification.

This invention relates to electrical fuse-primers; and it consists in certain improvements hereinafter described, shown in the accompanying drawings, and particularly specified in the claim.

The ordinary fuses used in detonating blasting charges are objectionable because in moist places the fuse is frequently ineffective, because the spark is extinguished by the moisture, because the length of fuse which must be used in order to give sufficient time for the man who lights the fuse to reach a place of safety produces a considerable amount of smoke, because when a plurality of charges are to be fired in rotation one or more of the number is apt to fail, causing what is known as a "miss-hole" and greatly weakening the effect of the series of blast.

In order to do away with some of the above-mentioned defects, electric caps and fuses have been used with success so far as eliminating the effect of moisture and smoke is concerned; but none of the fuses and caps heretofore employed have been adapted, so far as I am aware, to the firing of charges in rotation.

The object of the present invention is to provide an electrical fuse-primer which is very simple in construction, positive in operation, and well adapted for use in exploding blasting charges in rotation.

In describing the invention reference will be had to the accompanying drawings, in which—

Figure 1 is a view in longitudinal section through a blasting cartridge and cap with a fuse constructed in accordance with this invention placed in position for use in firing the cartridge. Fig. 2 is an enlarged sectional view of a piece of fuse with the end open for the introduction of the electrical priming-wire. Fig. 3 is a detail view of a portion of a conductor with the electrical priming-wire in-

serted thereinto. Fig. 4 is a detail view showing a modified mode of securing the conductor in the fuse.

Referring to the drawings, in which corresponding parts are designated by similar characters of reference throughout, 1 designates the fuse, which consists of a wrapper 2, formed with both ends open, as shown in Fig. 2, and having a filler of powder or other suitable combustible material 3, through the center of which extends a thread 4, of suitably-prepared cotton, to carry the spark. To prime the fuse, the conductor 5, having inserted therein a short piece of German-silver wire of small size, in order to have a high electrical resistance, is arranged in the upper end of the fuse, as shown in Fig. 1. The ends of the fuse-wrapper are then closed over the German-silver wire 6, and the end is sealed water-tight with paraffin or other suitable material. If desired, the upper portion of the fuse may be wrapped with rubber tape 11, as shown in Fig. 4. When prepared in either way, the fuse is ready for insertion into a cap 7, which consists of a shell 8, closed at the bottom and open at the top, as shown, and having the lower part filled with powder or other suitable explosive, as indicated at 9. The cap should be but little larger in diameter than the fuse, and the shell should be made of material which may be readily crimped into close contact with the fuse, as shown at 10. The fuse having been primed and introduced into the cap, the cap will be in condition for introduction into a cartridge C at the upper end and protected by tamping in the usual manner.

When it is necessary to fire a plurality of charges in rotation, the fuses will be cut in different lengths and introduced into the blast-holes in the order in which it is intended that the blast shall be exploded. The conducting-wires will then be connected in series with a battery or other generator (not shown) which must be of sufficient size to furnish a current which will heat the German-silver wire 6 in each fuse to redness. When the current is sent from the battery through the conductors 5 and the priming-wires 6, the fuses will all be simultaneously ignited and the spark being protected within the



fuse in each instance it will travel along the thread 4 until the lower end of the fuse is reached, and the cap 7 will then be exploded. As the fuses may be cut in any desired length, the charges may be exploded at any intervals desired, and the maximum effect of the whole number of charges, which depends upon their explosion at certain intervals and in regular order, will be obtained without possibility of failure. In addition to the power gained by exploding all of the charges at predetermined intervals the deleterious effect upon the timbers of a mine, which results from the detonation of a large number of charges simultaneously, is obviated.

By using electrical fuse-primers the necessity of ever having the fuse of considerable length is avoided, as the firing is done by operating the battery or other generator of electricity at a safe distance from the blast. Where a larger number of charges are to be exploded in rotation, the fuse introduced in the first charge may be so short that the charge will be exploded almost simultaneously with the passage of the current through the fuse, and the other fuses will be only long enough to provide for the required interval between each two explosions. As a consequence of the use of short fuses the amount of smoke resulting from the burning of the fuses is greatly diminished, and the fouling of the air, which is undesirable in a mine, is reduced to a minimum.

A special feature of my invention is that while it will ordinarily be manufactured and sold ready for introduction into a cartridge

the fuse may be primed without difficulty at the scene of the blast just before the fuse is introduced into the cap. Owing to this fact, the fuse may be carried in a coil and suitable lengths cut off, as required, each length being primed after being severed from the coil of fuse. In this way the timing of successive explosions can be completely controlled.

In addition to the features already pointed out it will be noted that my electrical fuse-primer is of such extreme simplicity of construction that it can be used at as little cost as the ordinary fuses or even less.

Having thus described the construction and use of my invention, what I claim as new, and desire to secure by Letters Patent, is—

An electrical fuse-primer consisting of a wrapper containing a combustible material, the upper portion of the wrapper being split and the combustible material divided to form a passage, an electrical conductor comprising a wire having a portion of high resistance, such portion being disposed in the passage, the split ends of the wrapper being brought together over the wire, and a wrapping of waterproof material surrounding such split portions and the adjacent ends of the electrical conductor and serving to hold all of the parts in proper position.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

FRANCIS MICHEL QUINN.

Witnesses:

W. B. WADSWORTH,  
BERT BARNETT.