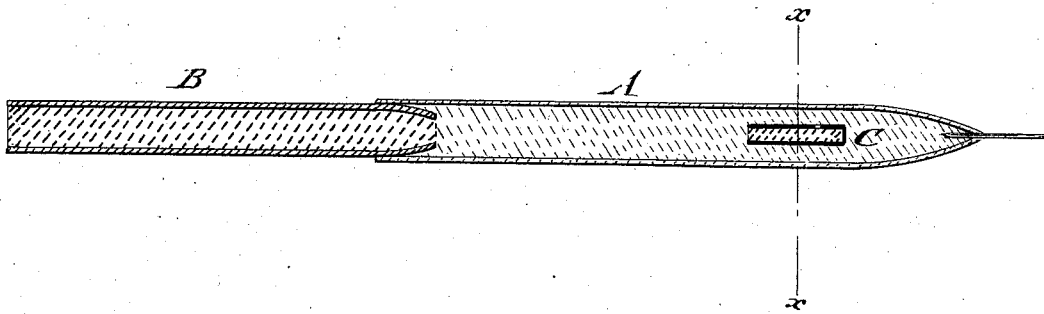


G. HAYES.  
Miner's-Squib.

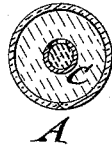
No. 200,193.

Patented Feb. 12, 1878.

*Fig. 1*



*Fig. 2*



WITNESSES:

*C. Newell*  
*C. Sedgwick*

INVENTOR:

*G. Hayes*  
BY *Mumby*

ATTORNEYS.

# UNITED STATES PATENT OFFICE.

GEORGE HAYES, OF GIRARDVILLE, PENNSYLVANIA.

## IMPROVEMENT IN MINERS' SQUIBS.

Specification forming part of Letters Patent No. **200,193**, dated February 12, 1878; application filed January 5, 1878.

*To all whom it may concern:*

Be it known that I, GEORGE HAYES, of Girardville, county of Schuylkill, and State of Pennsylvania, have invented a new and Improved Miner's Squib, of which the following is a specification:

In the accompanying drawings, Figure 1 represents a vertical longitudinal section of my improved squib for mining and blasting purposes; and Fig. 2 is a vertical transverse section of the same on line *x x*, Fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to an improved squib which is to be used for blasting in mining and other operations, and by which the miner or other person is warned that the squib is doing its work, so as to avoid the danger and loss of life incidental to the ordinary squib.

In the present squib the miner is compelled to go some distance from the blast for safety, and cannot see or hear without an alarm, and approaches frequently the bore-hole, thinking that the squib has failed to do its work, when suddenly the squib gets ignited and fires the charge, exposing the miner to considerable danger of life or limb.

The invention will first be described in connection with the drawings, and then pointed out in the claim.

In the drawings, A represents an ordinary squib, of paper or other material, charged with powder, in the customary manner. The squib is connected at the end with the match or fuse, by which it is lighted, and at the other end with the jumper B, that forms the connection

with the cartridge. The end of the jumper B is tapering, so that it is thrown by the ignition of the powder charge of the squib forward in the bore-hole, so as to convey the fire to the charge in the bore-hole overhead or sidewise of the needle-hole. In the squib is inserted at the time of its manufacture an alarm, C, which is made of tin or other metal, in the shape of a small barrel, and filled with powder. The closed end of the alarm B is placed toward the match end of the squib, and a small hole arranged near the closed end, by means of which the alarm is exploded when the burning powder that surrounds it reaches this hole. The explosion of the alarm indicates to the miner that the squib is doing its work and has thrown the jumper, and puts him on his guard, so as to expect the explosion of the charge.

In this manner the use of miners' squibs is less dangerous, and perpendicular bore-holes overhead may be reached in coal-mines, as the small squib section or jumper is caused to fly up, so as to cause ignition of the charge in more reliable and safer manner.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

A miner's squib consisting of an ordinary squib with an interior explosive alarm device, substantially as described, and for the purpose specified.

GEORGE HAYES.

Witnesses:

ELIJAH GREGORY,  
JOHN HANSON.