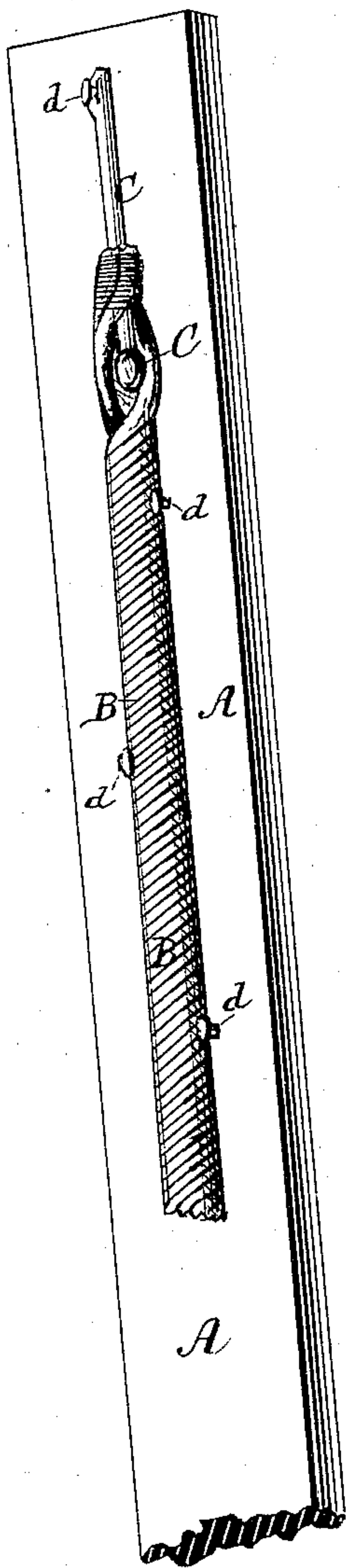


(No Model.)

R. BLACKLIDGE.
Method and Apparatus for Destroying Fire Damp in
Mines.

No. 232,443.

Patented Sept. 21, 1880.



WITNESSES:

H. R. Brown,
Wm. H. Rowe,

INVENTOR:

Robert Blackledge,

BY *Wm. H. Rowe,*

ATTORNEYS.

UNITED STATES PATENT OFFICE.

ROBERT BLACKLIDGE, OF ENFIELD, CONNECTICUT, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO HIMSELF AND ONE-HALF TO ALBERT J. BATTLES AND GEORGE WILCOX, TRUSTEES OF THE CHURCH FAMILY OF SHAKERS, OF SAME PLACE.

METHOD AND APPARATUS FOR DESTROYING FIRE-DAMP IN MINES.

SPECIFICATION forming part of Letters Patent No. 232,443, dated September 21, 1880.

Application filed May 21, 1880. (No model.)

To all whom it may concern:

Be it known that I, ROBERT BLACKLIDGE, of Enfield, in the county of Hartford and State of Connecticut, have invented a new and Improved Method and Apparatus for Destroying Fire-Damp in Mines; and I do hereby declare that the following is a full, clear, and exact description of the same.

When fire-damp or carbureted hydrogen has accumulated in large quantities in a mine it has been the custom heretofore to vacate the mine and fire the gas. This process is ordinarily attended with great danger, and I have found that the gas, when lighted, will, in most cases where the gas is heavy, first burn slowly, and as the flame increases in volume the gas will become highly heated from contact therewith, and, being driven into a confined space, will be caused to explode with great violence, and will destroy the timbering of the mine and choke up its passages with debris, which will render them inoperative and oftentimes result in the loss of life. This danger I desire to overcome by the employment of a great number of separate flash torches or rockets, that are to be distributed over the mine in various places, wherever the gas may be accumulated, and that may be lighted at such points simultaneously or in quick succession, so that the gas will be lighted at a new point before the flame from the first point lighted shall have reached the second point. By this means the gas may be ignited at the farthest point from the pit's mouth first and carry the gas-flame, after-damp, and smoke forward toward the mouth of the pit or the nearest draft-outlet, where the greater part of the poisonous gases of combustion and the gases remaining unconsumed will escape with the draft harmlessly.

The accompanying drawing represents a perspective view of a rocket constructed according to my invention, in which a lath or strip of wood, A, of sufficient length to extend from the floor to the roof of the mine, or nearly thereto, has secured to its upper end a piece of fuse, B, saturated with nitrate of potash, and of sufficient length to burn from one end nearly to the other within a period of time sufficient to ena-

ble the man who fires it to escape to a place of safety in a well-known manner.

The upper end of the fuse is wrapped around the head of a match, C, preferably formed of inflammable material other than sulphur, such as the parlor-match of commerce, which will become ignited with a quick flash of flame and will not throw off fumes of sulphur when lighted. The fuse and match are secured to the end of the wooden strip by means of carpet-tacks, or in any convenient manner. The bright flash caused by the ignition of the splint-match will quickly light the fire-damp; and as very many of the rockets are employed the use of sulphur-tipped matches should be avoided, as the fumes of the sulphur from many matches would vitiate the air and could not be readily freed from the mine.

In operation, when the mine shall have become poisoned with gas, and it is proposed to have a "clean up," the foreman dispatches a number of men each with a quantity of rockets to properly dispose of where the gas is collected. The rockets, by means of their sticks, may be propped against the walls, so that the fuse and splint-match will be held close to the hanging wall or roof of the mine. The rockets nearest the face of the mine are first lighted by means of a wire heated by passing it through the gauze of a Davy lamp, and the rockets are lighted in regular succession as the collier retreats to the mouth of the pit. The gas will thus be rapidly consumed by many flames before it can be heated and rarefied to an exploding temperature.

The fuses may be so timed that they will light the matches at suitable intervals, and when sufficient time has elapsed for the men to escape to a place of safety.

My experience in burning and destroying fire-damp in mines is that the gas is, in most cases, heavy and slow to burn, and when lighted will burn at the rate of about twenty-five feet in a minute, so that ample time will be given for it to be fairly lighted at different points to be consumed in separate flames.

It is considered best to so time the fuses that they will ignite the gas at different points suc-

cessively at such intervals of time that the volumes of gas ignited from one place shall fairly start in motion toward the pit's mouth or the natural draft-outlet of the mine before the next succeeding match is lighted; and I have found the flame, unconsumed gas, and products of combustion will by this simple means be started in motion toward the pit's mouth, or in the direction of the draft-outlet of the mine, where the greater portion of it will harmlessly escape. The remaining noxious gases may then be absorbed and driven off by the natural drafts of pure air through the mine.

I do not claim, broadly, the method of lighting gas in mines at one or more places by mechanism and devices arranged to fire the damp within sufficient time after they have been started to enable the miners to escape to a place of safety, as various mechanical contrivances operated by electricity, clock-work, cords, and rockets caused to travel from one part of the mine to another over wires, &c., as shown in the English Patents No. 2,727 of 1857 and No.

3,091 of 1869 have been heretofore devised to accomplish the aforesaid purpose.

What I claim as new is—

1. The method herein described of destroying fire-damp in mines by means of flash torches or rockets located at numerous places through the channels of the mine and flashed by fuses at such intervals that the gas may be lighted at different places successively or at nearly the same time from the most remote parts of the mine toward the pit's mouth or draft-opening, substantially as described.

2. The flash torch or rocket herein described, consisting of a wooden strip, to one end of which is attached a splint-match and fuse connected with each other, to be placed and supported in the required position in the mine, substantially as described.

ROBERT BLACKLIDGE.

Witnesses:

SOLON C. KEMON,
CHAS. A. PETTIT.