

No. 689,367.

Patented Dec. 17, 1901.

H. J. RICHARDS.

MINER'S SQUIB.

(Application filed Oct. 17, 1901.)

(No Model.)

Fig. 1.

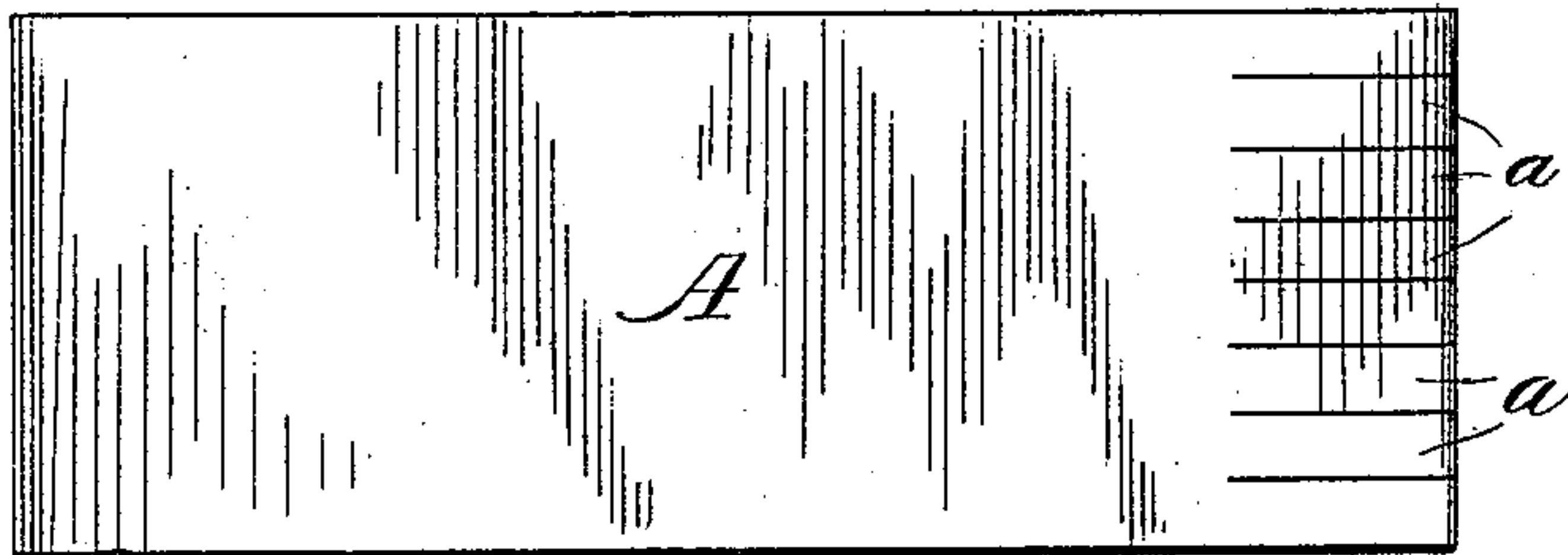


Fig. 2.

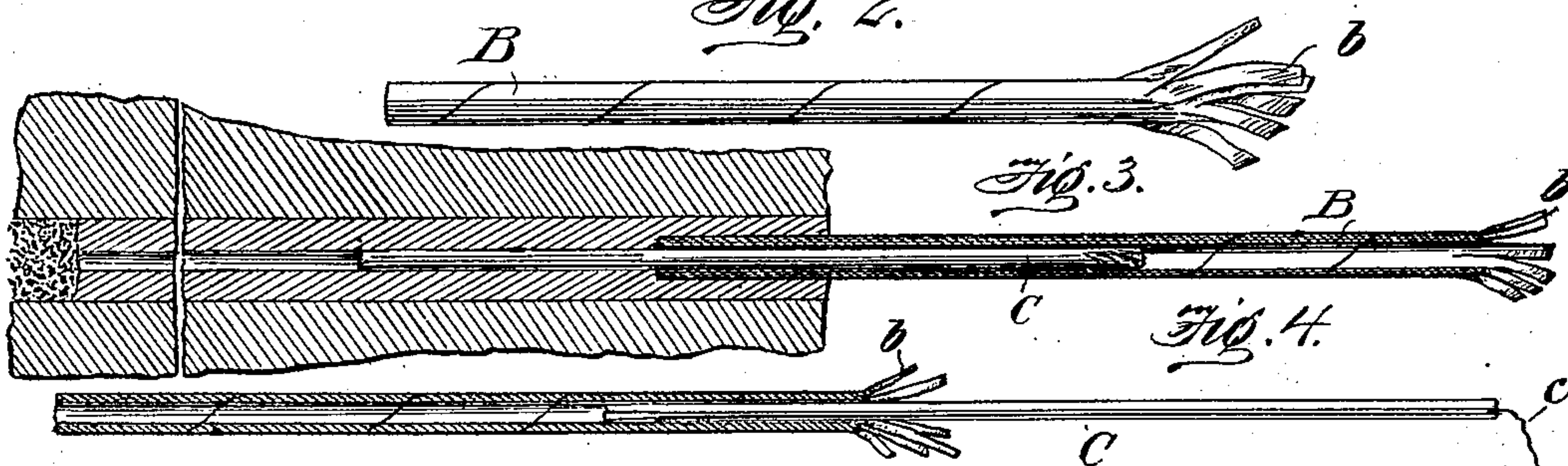


Fig. 3.

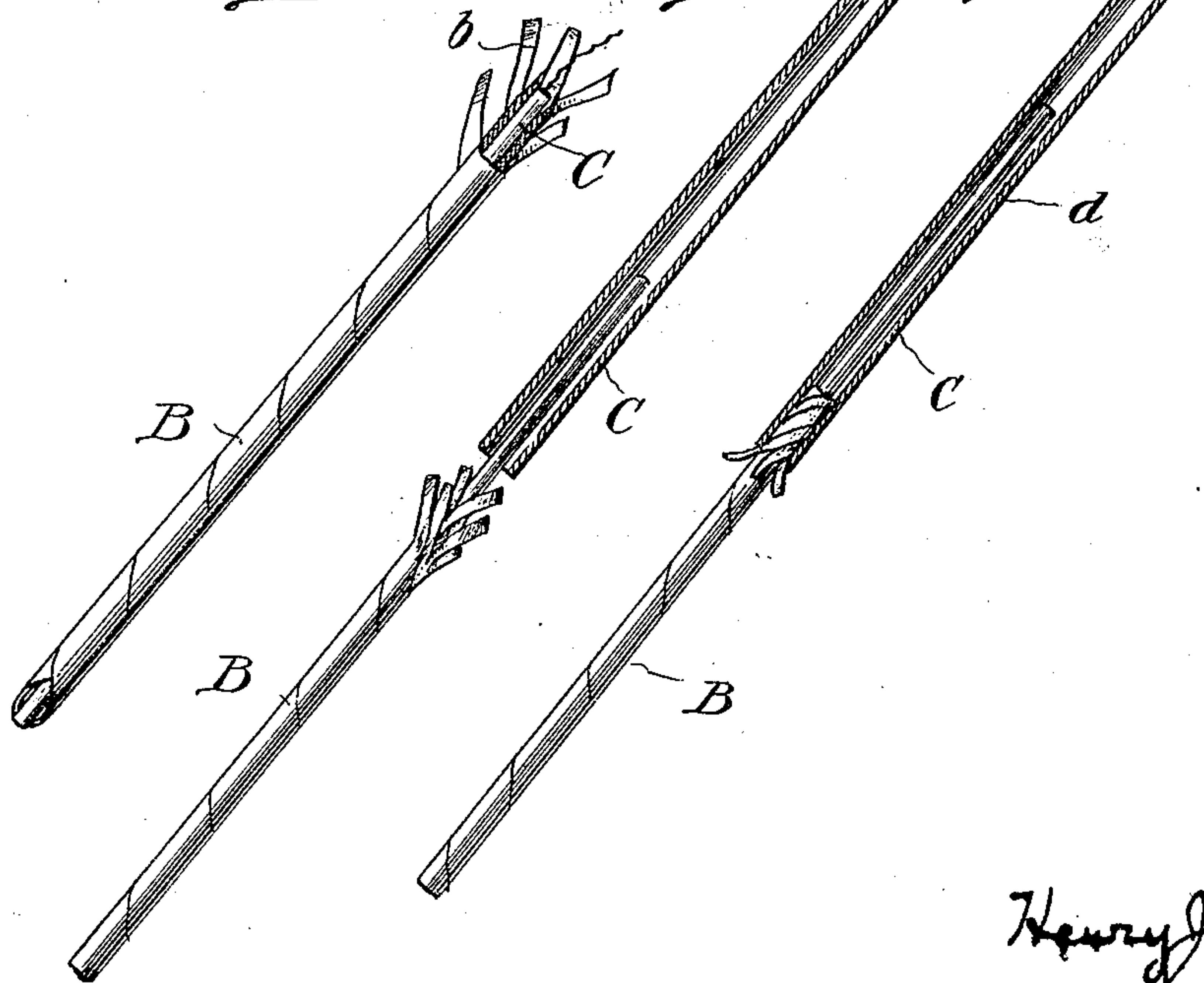
B

Fig. 4.

Fig. 5.

Fig. 6.

Fig. 7.



Witnesses

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HENRY J. RICHARDS, OF WILKESBARRE, PENNSYLVANIA.

MINER'S SQUIB.

SPECIFICATION forming part of Letters Patent No. 689,367, dated December 17, 1901.

Application filed October 17, 1901. Serial No. 79,045. (No model.)

To all whom it may concern:

Be it known that I, HENRY J. RICHARDS, a citizen of the United States, residing at Wilkesbarre, in the county of Luzerne, State of Pennsylvania, have invented certain new and useful Improvements in Miners' Squibs, of which the following is a description, reference being had to the accompanying drawings and to the letters of reference marked thereon.

My invention relates to blasting-squibs for use of miners, and has for its object the production of a device in which all danger of the powder escaping from the tube into the match is avoided, which can be readily fired without cutting off the end of the powder-tube, which can be extended or contracted to give a longer or shorter match portion, whereby the time elapsing between the lighting of the match and the firing of the charge may be made greater or less, thus affording ample opportunity for the miner to reach a place of safety before the blast is fired, which can with equal facility be used in exploding downward blasts and inclined blasts, as well as upward ones, and which is so constructed as to seal and prevent the escape of gas from the blasting-barrel.

The invention therefore consists, primarily, of a miner's squib comprising a shell portion or tube to contain the powder or other explosive and a match to ignite the shell, said match being adjustable upon the shell or tube.

Secondly, it consists of a miner's squib comprising a shell portion or tube to contain the powder or other explosive and a match to ignite the shell surrounding the same and freely moving thereon.

Thirdly, the invention consists of a miner's squib comprising a shell portion or tube to contain the powder or other explosive and a match to ignite the shell, said squib being provided with means for frictionally engaging the wall of the opening leading into the charge-hole, whereby it is prevented from accidental displacement therein.

Fourthly, it consists of a miner's squib comprising a shell portion or tube to contain the powder or other explosive and a match to ignite the shell, said match being formed with projecting portions to frictionally engage the

wall of the opening leading into the charge to prevent displacement and also, if desirable, so constructed as to prevent the escape of gas.

Finally, the invention includes other features, all as hereinafter described, and referred to in the appended claims.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 is a plan view of the blank from which the match is rolled. Fig. 2 is a view of the match complete. Fig. 3 is a sectional view illustrating the squib as a whole and the manner of using it. Fig. 4 is a view, partly in section, of the match and explosive-containing shell forming the squib as a whole. Figs. 5 and 6 represent, partly in section, the squib as a whole respectively in contracted and expanded positions; and Fig. 7 is a similar view illustrating the application of the invention to firing a downward blast, the wings or projections on the match engaging the walls of the blasting-barrel.

In the drawings, A represents the match-blank, which is herein shown as constructed of a rectangular piece of paper or any other suitable material, having at one end the slits *a*, formed therein, so that when the blank is rolled up spirally and pasted it take a tubular form with projecting wings *b*, as shown in Fig. 2.

B represents the match as a whole, which is formed to encircle the cylindrical case or tube C, which contains the charge of igniting material. This cylindrical case or tube or shell portion is constructed, as usual, of paper or similar material and may be rolled around a metal or other former, which when removed leaves a tubular paper receptacle to receive the powder, one end of the tube being preferably closed in the operation of rolling and the other being closed by a lump of hard soap or other sealing material.

The match B loosely encircles the igniting-tube and is movable therein, so that the same length squib may be used for holes of varying depth, and the forward end of the match may be made to extend a greater or less distance from the point at which its flame will touch the igniting-tube, thus varying as desired the time elapsing between the lighting

of the match and the firing of the charge and giving the miner more or less time to seek a place of safety, as he requires. The match is usually adjusted along the igniting-tube by catching hold of its end and moving it the desired distance; but the tube itself may be provided with a string, cord or wire, &c., by which it may itself be manipulated. The tube and match are usually about of equal length, so that when in contracted position the length of the tube marks the entire length of the squib as a whole. Preferably near the inner end of the tube a band *d*, as of cord or other material, is secured around the tube, so as to cause a slight explosion before the charge is fired, by which the miner is warned that the squib is doing its work. Other forms of alarm may be used—as, for instance, the insertion of an interior explosive alarm device in the tube—but the above answers every purpose and is herein claimed as one of the features of the invention.

One of the important features of the invention resides in the projections *b*, extending from the match, which when the squib is inserted in the blasting-barrel or in the opening after the same has been tamped frictionally engage the walls thereof, and, as shown in Fig. 7, prevent accidental displacement of the squib, and, if desired, may also be of such character as to close the space between the squib and the walls and prevent the escape of gas from the hole containing the charge. The means herein shown comprise the wings or projections formed in the match-blank; but other means for accomplishing this result may be employed without departing from the spirit of my invention.

Having thus described my invention, what

I claim, and desire to secure by Letters Patent, is—

1. A miner's squib comprising an igniting-tube, and an adjustable match on said tube; substantially as described.

2. A miner's squib comprising an igniting-tube and a match surrounding the same, and movable thereon; substantially as described.

3. A miner's squib comprising an igniting-tube, and a match movable longitudinally with respect to each other; substantially as described.

4. A miner's squib comprising an igniting-tube, and a match, and provided with means for engaging the walls of the surrounding opening in which the squib is placed to prevent accidental displacement; substantially as described.

5. A miner's squib comprising an igniting-tube and a match, said match being provided with projecting portions to engage the wall of the opening in which the squib is placed; substantially as described.

6. A miner's squib comprising an igniting-tube and a match, said match being provided with projecting portions to engage the wall of the opening in which the squib is placed, and to close the same to prevent the escape of gas; substantially as described.

7. A miner's squib comprising an igniting-tube and a match, the former having a contracting band secured to it to cause a signal to be given; substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY J. RICHARDS.

Witnesses:

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GRAFTON L. MCGILL.