

(No Model.)

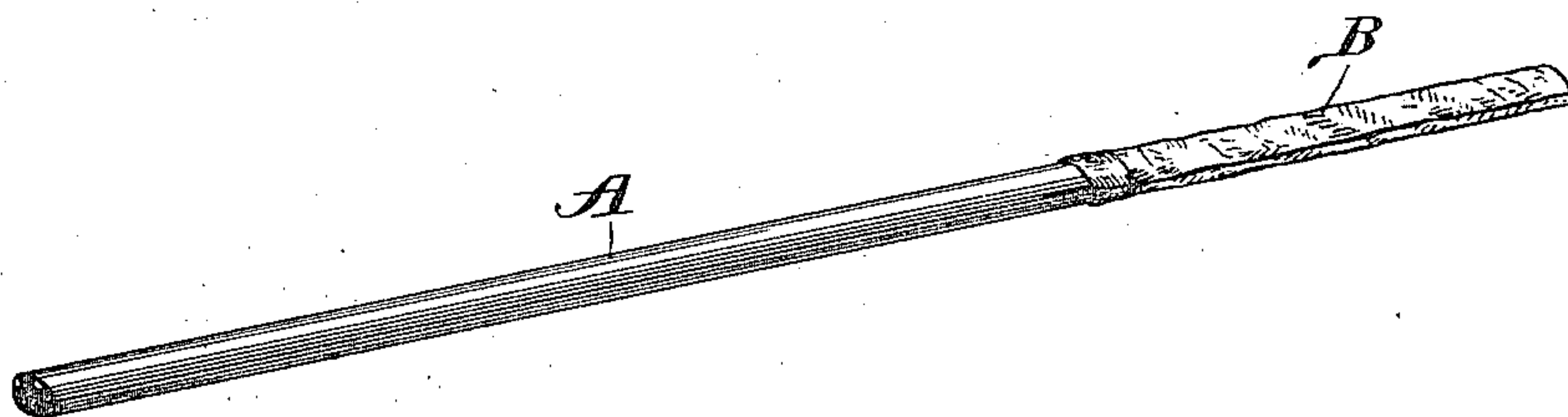
J. R. POWELL.

MINER'S SQUIB.

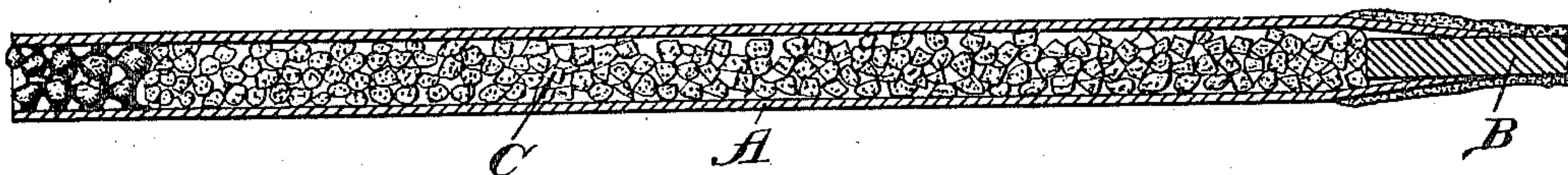
No. 326,239.

Patented Sept. 15, 1885.

*Fig. 1.*



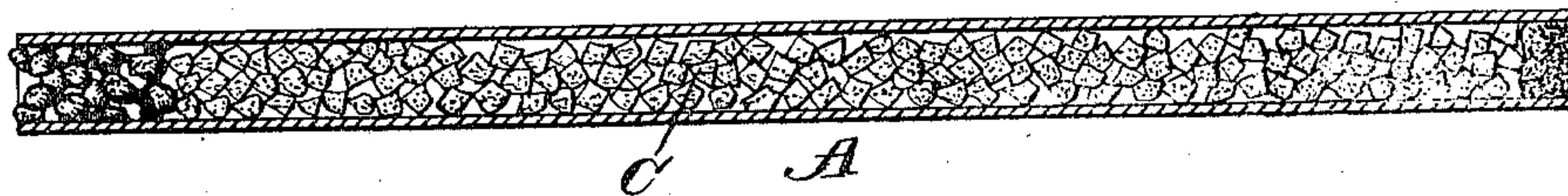
*Fig. 2.*



*Fig. 3.*



*Fig. 4.*



WITNESSES

*Percy C. Brown*  
*Edward G. Siggers*

INVENTOR

*John R. Powell.*  
By *C. A. Snow*  
his Attorneys.



# UNITED STATES PATENT OFFICE.

JOHN R. POWELL, OF PLYMOUTH, PENNSYLVANIA.

## MINER'S SQUIB.

SPECIFICATION forming part of Letters Patent No. 326,239, dated September 15, 1885.

Application filed July 10, 1885. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. POWELL, a citizen of the United States, residing at Plymouth, in the county of Luzerne and State of Pennsylvania, have invented a new and useful Improvement in Miners' Squibs, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to miners' squibs; and it has for its object to provide an improved mode of sealing the rear end of the paper tube or straw shell, whereby further provision will be made for safety in the use of the squib, dampness will not affect the seal, and the manufacture of the squib simplified and attended with less labor.

With these ends in view, the said invention consists in sealing the rear end of the paper tube or shell with a small quantity of powder, which, being mixed with oil-varnish, gold or gilder's oil-size, or the like, will be caused to adhere to the interior of the tube or shell in such a manner as to leave small openings between the several grains of powder to allow the admission of air to the interior of the tube, and yet form a compact mass which will prevent the escape of the powder filling, all as hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a squib sealed at its rear end in accordance with my invention. Fig. 2 is a longitudinal section of the same. Fig. 3 is a transverse section on an enlarged scale. Fig. 4 is a view illustrating my invention applied to a loose squib without a match.

Like letters are used to designate corresponding parts in the several figures.

Referring to the drawings, A designates the body of the squib, which in the present instance is constructed of paper, wound spirally into a cylindrical or tubular form to contain the powder filling. At the front end of the squib-tube is inserted one end of the match B.

To retain the powder filling C within the squib-tube, I employ an improved method of sealing the rear end thereof, proceeding as follows: I take oil-varnish or the like and mix it thoroughly with a desired amount of powder, until the surface of the grains is coated with the varnish, which will cause the

grains to adhere together. While the powder mixture is in this moist state a small quantity is pressed through the open rear end of the tube or shell, the latter having been previously filled with the powder charge. This powder mixture will be caused to adhere to the interior of the tube or shell, and since the grains of powder also adhere together, it will be seen that the open rear end of the tube or shell is permanently closed by a compact mass, so as to prevent the escape of the powder filling. When the powder mixture becomes dry, it forms a compact mass; but since the grains of powder are irregular in form, small openings or spaces will be left between the mass to allow air to enter the tube. These small openings provided between the grains of powder are shown more clearly in the enlarged sectional view, Fig. 3, the irregular form of one grain abutting against the irregular form of a second grain and adhering thereto. The small openings or spaces provided through the sealing mass at the rear end of the squib-tube also allows the flame to have free communication with the blasting charge on the explosion of the squib.

I have stated that I use oil-varnish to mix with the powder to form the sealing mass; but I may employ spirit-varnish, gold or gilder's oil-size. The latter is compounded from boiled oil, thickened with yellow ochre or calcined red ochre, and reduced to the proper thickness by grinding. I may also use a mixture of shellac and alcohol, and therefore do not wish to be limited to any particular ingredient or ingredients to cause the powder-grains to adhere together and also to the squib-tube, and thus form a sealing mass. However, I prefer to employ a composition of which oil forms an ingredient, so that the sealing mass, when formed, will be impervious to moisture and resist the action or effect of dampness. Such compositions will not dissolve the powder, but will merely coat the outer surface of the grains and effect the close adherence of the latter to form the sealing mass. It will therefore be understood that any composition of ingredients which will cause the grains of powder to adhere together and yet not dissolve the powder may be employed and effect the end in view.



I may employ this mode of sealing the rear end of the squib-tube either on paper or straw shells, or on any of the other forms of squibs now extensively sold by me, whether the match is secured in one way or the other, or whether it is made separate from the tube.

The seal cannot be broken, for the sealing mass is firmly secured together, and will successfully resist all tendency to separate. Since the seal is made of powder, the miner will immediately see that the rear end will successfully explode the charge of powder within the drill-hole without cutting off the end.

The spaces or openings through the sealing mass will be left at the time that the seal is applied, so that when the mass is dry the squib will be in condition for use.

In Fig. 4 I have shown a loose squib without a match attached as in the other figures, having its rear end sealed in the manner before described, and the front end closed or sealed with Burgundy pitch, resin, or other suitable ingredients.

Having described my invention, I claim—

1. The combination, with the squib-tube, of the herein-described seal formed of grains of

powder held in a compact mass within the tube by the addition of suitable adhesive substance, openings or spaces being left between the grains of powder forming the mass and the side of the tube, as set forth.

2. The miner's straw or paper squib, in combination with the herein-described seal formed by a mixture of powder and oil-varnish, gilder's oil-size, or other suitable composition which will not dissolve the powder, but hold it in a compact mass and cause it to adhere to the interior of the squib-tube, as set forth.

3. The combination, with the tube or shell, of the herein-described seal formed of a mixture of powder and a suitable composition which will hold the grains of powder in a mass and cause the latter to adhere to the interior of the squib-tube, as set forth.

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

JOHN R. POWELL.

Witnesses:

EDWARD G. SIGGERS,  
WM. N. MOORE.