(No Model.)

# J. R. POWELL.

## MINER'S SQUIB.

No. 326,057. Patented Sept. 8, 1885.

Fig. 1.

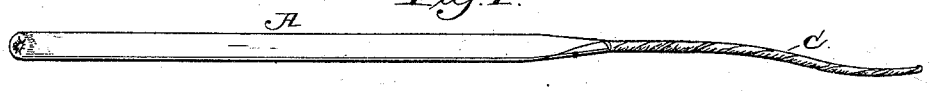



Fig. 2.

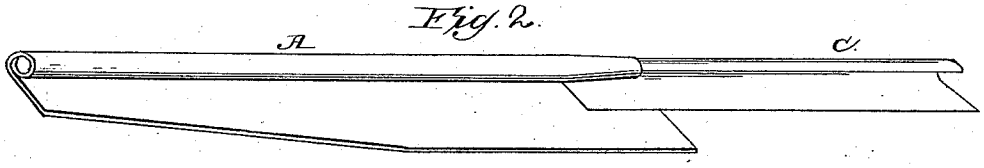



Fig. 3.

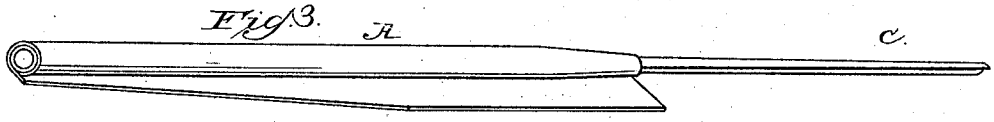



Fig. 4.

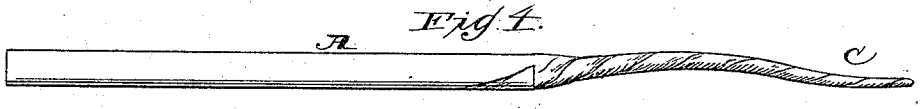



Fig. 5.

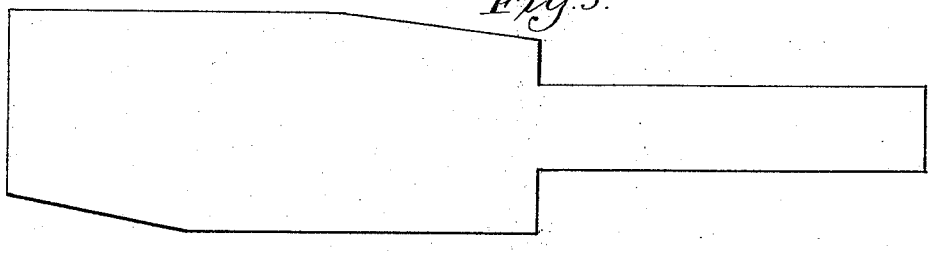


Fig. 6.

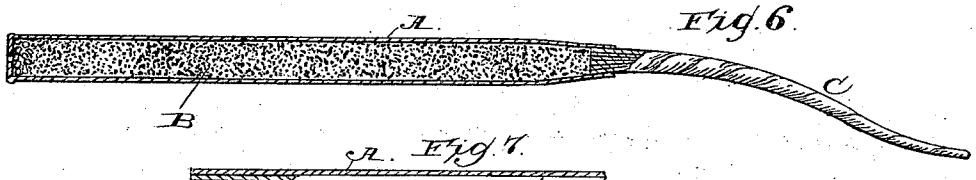



Fig. 7.

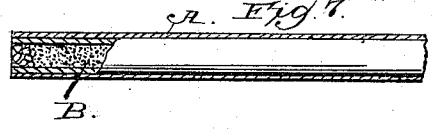



Fig. 8.




WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN R. POWELL, OF PLYMOUTH, PENNSYLVANIA.

## MINER'S SQUIB.

SPECIFICATION forming part of Letters Patent No. 326,057, dated September 8, 1885.

Application filed April 4, 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 new and useful Improvements in Mining-Squibs, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to mining-squibs; and it has for its object to provide an improved mode of sealing the rear end of the tubular shell or case, by means of which the powder is securely retained in the latter, and yet a sufficient opening will be left through said rear end for the admission of air to the interior of the case for the purpose well known.

A further object of the invention is to provide an improved construction of match, whereby the latter will be securely held in place, and will also serve to close or seal the front end of the tube.

With these ends in view the said invention consists in the novel construction and combination of parts, as will be hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a mining-squib embodying my improvements. Fig. 2 is a perspective view showing the paper which forms the shell partly rolled over a portion of the match. Fig. 3 is a similar view showing the shell or case rolled over the inner end of the match, the edge of the shell being in position for completing the connection. Fig. 4 is a front elevation of a modification, the match being made integral with the body of the shell. Fig. 5 is a plan view of the blank from which this modified form of squib is made. Fig. 6 is a longitudinal section of the form illustrated in Figs. 1, 2, and 3. Fig. 7 is a longitudinal section of a squib-tube constructed of a straw shell, showing an improved manner of sealing this class of squibs. Fig. 8 is a detached perspective view of a portion of the shell to illustrate this improvement more clearly.

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

Referring to the drawings, A designates the tubular shell or case, B the explosive filling, and C the match.

In the form shown in Figs. 1, 2, 3, I take a rectangular piece of paper (either manila, tissue, or such as will roll easily without breaking) to form the shell A, and paste at some distance from one end of the same the inner end of the match C, the latter being made from a piece of colored tissue-paper, so that when the squib is completed the color of the match will be distinct and different from the shell or case. This piece of tissue-paper forming the match is laid flat against the piece which forms the shell, and in the center of the front end of the latter, so as to leave space on one side to partly form the shell before reaching the match, and also room on the other side for the doubling or pasting of the edge of the shell to complete the squib. In constructing the latter I employ a cylindrical-shaped needle or bar, which is pointed or contracted at one end, to be used as a form around which the paper sheet forming the shell or case is wound. I lay this needle on the paper sheet A′, at the left-hand side thereof, and begin to roll the latter around the needle, and when the match C is reached the roll is well formed. I continue the rolling or winding over the match, (as per Fig. 2,) the latter being twisted or rolled correspondingly within or around the shell until the other side of the match is reached, when the parts are in the position shown in Fig. 3, the other side or edge of the shell standing out, ready to be pasted down. Mucilage or other adhesive substance being applied to this side or edge, the same may be secured in place to complete the squib-tube.

It will be observed that the side or edge of the shell or case which is pasted down serves to secure the match in place and prevent it from untwisting; and, since the match is within the tube or shell, there will be less possibility of detachment.

Since the forming needle or bar is contracted at its front or outer end, the shell or case may be pressed or contracted around the point of the needle during the process of making the squib to serve as a more secure connection for the shell and its match. It will thus be seen that by the twisting or rolling of the match and shell, together with the aforesaid pressing or contracting of the two around the extreme front end, the latter is sealed or closed so as to prevent the escape of powder.

When the match and shell have been properly connected, as described, the powder or other

explosive filling is supplied to the shell or case, but not entirely to the rear end, a sufficient space being left at the latter end for the insertion of a few larger grains of powder than those which are within the body. I then take a series of these squibs, when so far completed, with their rear ends all on the same plane, and commence to seal the same, using a thin board provided with depending pins which enter through the rear ends of each of the squib-tubes. The rear ends of each of the squib tubes or shells are wet with some adhesive substance, when this board is pressed downward against the same, causing the paper body or shell to be turned inward around the pins, and thereby contracting the opening at the rear end of the squib-tube. The board can then be raised, withdrawing the pins from their respective tubes or shells, when the latter, after being dried, are in condition for use.

It will be observed that the pins serve to retain a small opening at the rear end of the squib-tube, no matter how much the latter is pressed in by the board, and as I place a few large grains of powder at the rear end of the case, tube, or shell, which grains are greater in size than the diameter of the hole or opening, there will be very little possibility of either the large grains of powder, or those forming the filling, escaping through this hole or opening.

It will also be seen that by leaving this hole or opening at the rear end of the shell, tube, or case the charge within the latter on explosion will be caused to work back, so as to communicate with the charge of powder at the bottom of the hole which has been drilled.

In Fig. 7 is illustrated the mode of sealing the rear end of the squib when a straw shell is employed. This is effected by dipping or applying adhesive substance to the interior of the shell at the rear end, and then inserting a few grains of powder through the same, causing it to adhere to the sides of the shell. The grains of powder which are thus inserted should be larger than those which form the filling, so that there will be no possibility of any of the latter escaping. By this arrangement sufficient space or passage is left between the large grains, so that on the explosion of the squib-charge free communication may be had with the blasting-charge.

By reference to Figs. 4 and 5 will be seen a modified form of squib-tube, in which the match is made integral with the body of the shell or case. The manner of rolling the shell or case is substantially the same as has been previously described, the forming needle or bar being employed. It will be observed that the match projects from the shell (see Fig. 5) at or about the center of its top edge, leaving room on one side for the roll to be formed before reaching the match, and on the other side for the edge of the case to be turned down to complete the connection. The top edge of the piece A forming the tube or case is higher or extends forward on the right-hand side of the match more than on the other side, so that when turning down the former the connection is made more secure to prevent the match from untwisting. It will also be seen that the match may be twisted as the shell or body is wound, or it may be flattened or pressed out, as found convenient and desirable.

In the construction shown in Figs. 4 and 5 the explosive filling may be applied and the seal at the rear end of the tube or case made in the same mode as in the form shown in Figs. 1, 2, and 3, or any other manner of sealing may be substituted as may be deemed expedient and desirable.

The operation and advantages of my invention will be readily understood from the foregoing description, taken in connection with the annexed drawings, and therefore need not be repeated here.

By the peculiar connection of the match to the shell, case, or tube (whether the match is made integral or of a separate piece) said match serves to close or seal the front end of the shell, and thus obviate the necessity of a separate seal at that end.

I prefer the construction shown in Figs. 1, 2, 3, as by that means I am enabled to make the match from a colored piece of tissue-paper. This mode of manufacturing the squibs is deemed desirable, for the distinguishing color between the match and the shell, case, or tube causes the purchaser to see at an instant the peculiar, novel, and safe connection, and also see that it would be impossible for powder to escape from the shell into the match.

Having described my invention, I claim—

1. In a mining-squib, the shell, case, or tube made from a piece of paper, having at only a portion of its edge or end the match projecting therefrom, so that when the case or tube is rolled or formed the match is correspondingly twisted or wound, and thus forms a seal for the front end of the shell, case, or tube, as set forth.

2. In a mining-squib, the shell, case, or tube made from a piece of paper, and the match projecting from the same at the center of its top edge or end, so as to leave space on one side for the roll to be formed before reaching the match, and space on the other side for the case or tube to be turned over in completing the connection, 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:

WM. N. MOORE,

E. G. SIGGERS.