No. 741,968. PATENTED OCT. 20, 1903.

T. R. JONES.

MINER'S BLASTING SQUIB.

APPLICATION FILED APR. 21, 1903.

NO MODEL.

Fig. 1.

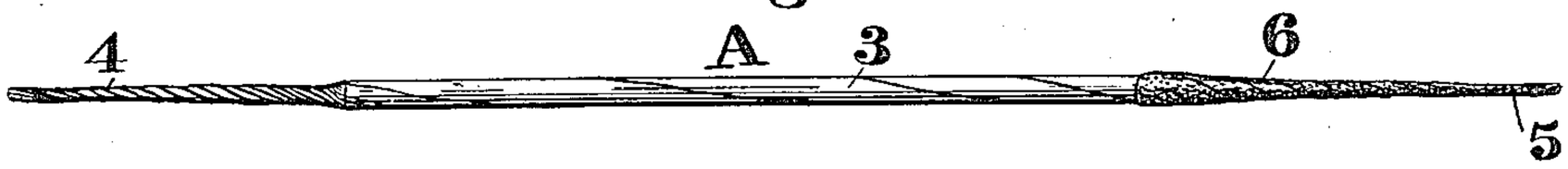


Fig. 2.

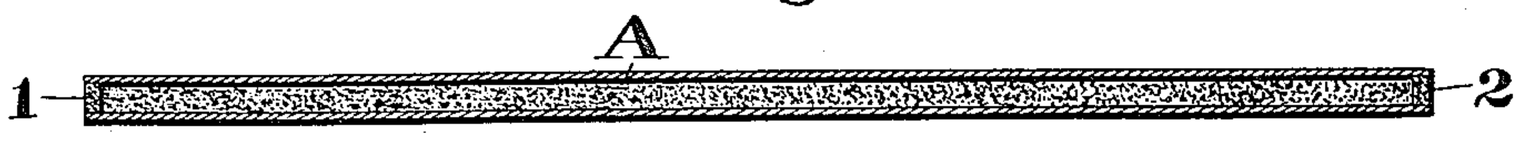


Fig. 3.

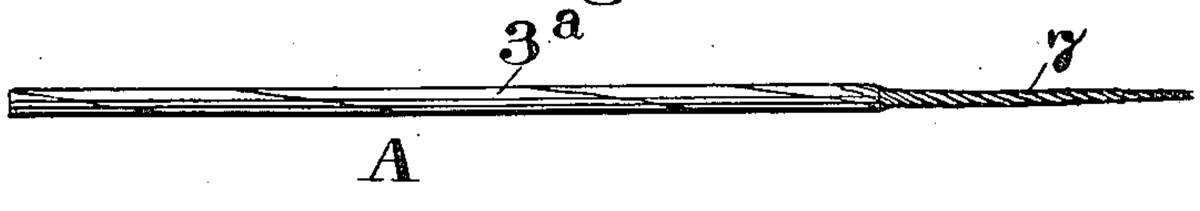


Fig. 4.


Fig. 5.

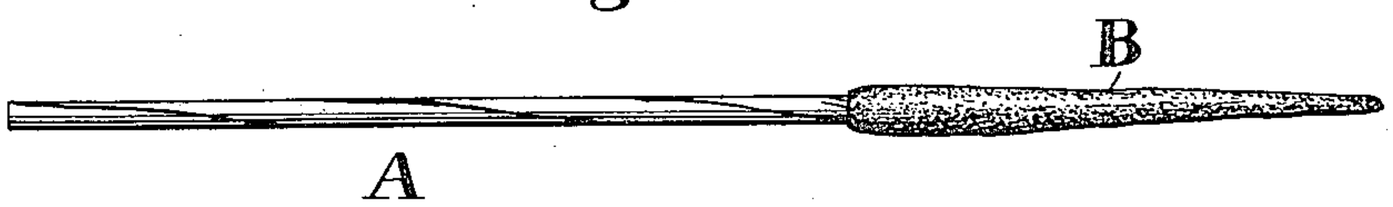


Fig. 6.

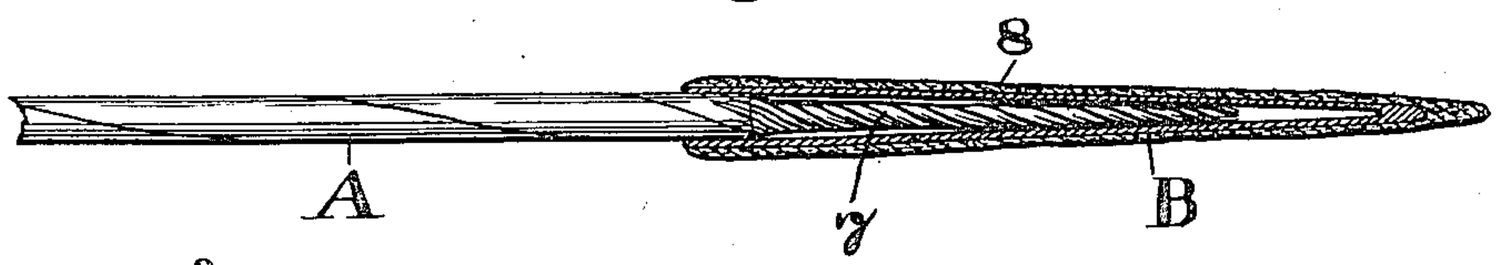



Fig. 7.

Witnesses
Percy C. Bowen
Milton Lenoir.

Inventor
Thomas R. Jones
By Robert Watson
Attorney

No. 741,968. Patented October 20, 1903.

# UNITED STATES PATENT OFFICE.

THOMAS R. JONES, OF WILKESBARRE, PENNSYLVANIA.

## MINER'S BLASTING-SQUIB.

SPECIFICATION forming part of Letters Patent No. 741,968, dated October 20, 1903.

Application filed April 21, 1903. Serial No. 153,601. (No model.)

*To all whom it may concern:*

Be it known that I, THOMAS R. JONES, a citizen of the United States, residing at Wilkesbarre, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Miners' Blasting-Squibs, of which the following is a specification.

This invention comprises improvements in miners' squibs adapting the same squib for use in blasting coal in places where there is gas or places where there is no gas. In chambers where there is no gas the miner uses a squib having a match which will burn with a flame in preference to one having a match which burns without a flame, for the reason that the former burns more rapidly and it is easier to see from a safe distance whether the squib is burning or has gone out and for the further reason that a match which burns with a flame is less liable to go out than the one which burns without a flame. In places where there is danger of gas explosions it is necessary to use a squib having a match which burns without a flame. For these reasons it is customary for the miner to provide himself with two kinds of squibs, one kind having a match which burns with a flame and the other kind having a match which burns without a flame. It frequently happens, however, that a miner finding that his supply of squibs having matches that burn without a flame has run short will take the chance of explosion and use, in a gaseous place, a squib having a flaming match, and serious explosions have frequently resulted from this cause.

The object of my invention is to provide a squib suitable for gaseous places and also for blasting in places where there is no gas, this single squib having all the advantages of the two squibs generally carried by miners in mines where gas prevails. With my improved squib, equally adapted for both purposes, the miner is not obliged to carry two forms of squibs and he is not tempted to use a flaming match in a drill-hole from which gas issues.

In the accompanying drawings, Figure 1 is a side view of one form of squib embodying my invention. Fig. 2 is a longitudinal central section through the body of the squib. Fig. 3 is a side view of a squib having a non-flaming match at one end. Fig. 4 is a side view of a hollow cap or match which burns with a flame and which is adapted to fit over the non-flaming match shown in Fig. 3. Fig. 5 is a side view of the squib and hollow match or cap shown in Figs. 3 and 4 with the cap in position upon the squib. Fig. 6 is an enlarged side view of the non-flaming match and end portion of the squib with the cap applied thereto, the latter being shown in central section; and Fig. 7 is a side view of a squib having two matches at one end, one match being adapted to burn with a flame and the other without a flame.

Referring to Figs. 1 and 2 of the drawings, A indicates the body of the squib, consisting of a tube of paper or other suitable material containing powder and having its ends closed by plugs 1 2 of pasty material, preferably some material which will burn, or other material, such as soap, may be employed to choke the ends of the tube and retain the powder. A wrapper 3 of paper, which will burn without a flame and commonly known as "touch-paper," is wound around the tubular part or body of the squib after the latter has been closed at its ends, and the wrapper extends some distance beyond both ends of the tube and is twisted to form matches 4 and 5 at the opposite ends of the squib. After the matches have been twisted one of the matches—as, for instance, the match 5 in the drawings—is saturated or coated with a substance which will burn with a flame. In the drawings the match 5 is illustrated as having a coating 6, which may be of brimstone. Both of these matches may be readily torn off from the squib at the points joining the body portion, and the matches may therefore be considered as detachably connected to the body portion of the squib.

In using the squib in places where there is no gas the miner tears off the match 4 and ignites the match 5. The latter match by reason of the sulfur or other flaming coating burns with a flame which the miner can observe from a safe distance, and it burns more rapidly and is less liable to go out than the match made only of touch-paper. In using the squib in a gaseous place, however, the miner tears off the match 5 and after having

ignited the match 4 inserts the squib in the drill-hole. The match 4, being made of marial which will not burn with a flame, cannot ignite the gas. It will be seen, therefore, that this squib, having both a flaming and a non-flaming match, is suitable for all purposes, and there is no reason why a miner should carry two forms of squibs or take any risks by reason of running short of one kind.

As the tubular portion of the squib containing the powder is blocked or plugged at both ends before the wrapper which forms the matches is applied, the powder cannot escape into the matches and cause premature explosions.

The squib shown in Figs. 3 and 5 has a body portion the same as that shown in Fig. 2; but the wrapper $3^a$ instead of being extended to form matches at both ends is extended at one end only and twisted to form a detachable match 7. This match burns without a flame, and the squib may therefore be used in gaseous places. This squib is provided with a removable cap B, which fits over the match and around the adjacent end of the tubular portion of the squib. This cap consists of a cone made of paper or other material which will burn, and it is provided with a coating 8 of brimstone or other slow-burning material which burns with a flame, or the cap may be impregnated with material which will cause it to burn slowly with a flame, or it may be made entirely of such material. The squibs when sold are each provided with a cap, as shown in Fig. 5. Where no gas exists, the squib is used without removing the cap, the latter causing the inner match to burn more rapidly and to exhibit a flame. In a gaseous place, however, the cap B is removed and the inner match 7 when ignited burns without a flame. The cap is in reality a match, so that the squib shown in Fig. 6 may be considered as having two detachable matches, one of which is adapted to burn with a flame and the other without a flame. The caps may be applied to many forms of squibs now in use having non-flaming matches, and such squibs may then be used in gaseous and non-gaseous places. The outer cap or match is preferably made conical and closed at its smaller end, thus forming, with its sulfur coating, a waterproof envelop or inclosure for the inner non-flaming match; but it may be cylindrical and either closed or left open at its outer end. The conical form of cap is easily applied and will fit closely around the ends of squibs which vary somewhat in their diameters.

In Fig. 7 I have shown a squib in which the body A of the squib is inclosed in a double wrapper consisting of two strips of touch-paper, (indicated by the reference characters $3^a$ and $3^b$, respectively,) which wrappers are both extended beyond one end of the body of the squib and twisted to form separate detachable matches $4^a$ and $5^a$. The match $5^a$, as shown, is coated with material which will cause it to burn with a flame, while the match $4^a$, which is not so treated, will burn without a flame. In using the squib the miner tears off the match which he does not wish to use and ignites the remaining match, or he may in this form of squib leave both matches upon the squib and ignite whichever one he finds it expedient to use.

As each of the various forms of squibs shown and described has two matches having different combustible properties, one adapted for gaseous and the other for non-gaseous places, and as the flaming match in each instance is detachable, the miner has no excuse for using a flaming match in a gaseous place, and when he is provided with squibs he is sure to have the non-flaming as well as the flaming match on each squib.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. A miner's squib comprising a body portion and two matches connected thereto, said matches having different combustible properties.

2. A miner's squib comprising a body portion and two matches connected thereto, one of said matches being adapted to burn without a flame, and the other match being adapted to burn with a flame.

3. A miner's squib comprising a body portion and two matches connected thereto, one of said matches being adapted to burn without a flame, and the other match being detachable and adapted to burn with a flame.

4. A miner's squib comprising a body portion and two matches detachably connected thereto, one of said matches being adapted to burn without flame, and the other being adapted to burn with a flame.

5. A miner's squib comprising a body portion and a match connected to each end thereof, one of said matches being adapted to burn without flame, and the other being adapted to burn with a flame.

6. A miner's squib comprising a body portion and a match connected to each end thereof, one of said matches being adapted to burn without flame, and the other being coated with a slow-burning substance adapted to burn with a flame.

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

THOMAS R. JONES.

Witnesses:

WM. N. REYNOLDS, Jr.,

MINNIE STOUT.