

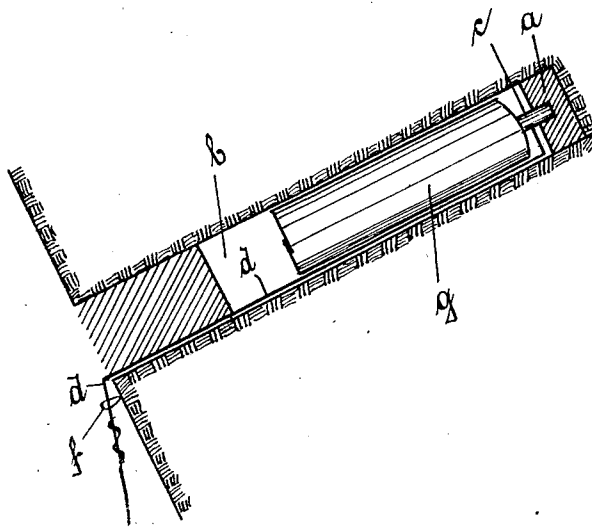
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METHOD OF PREPARING BLASTING CHARGES FOR IGNITION

Filed July 19, 1920



Witnesses.

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UNITED STATES PATENT OFFICE.

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METHOD OF PREPARING BLASTING CHARGES FOR IGNITION.

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(GRANTED UNDER THE PROVISIONS OF THE ACT OF MARCH 3, 1921, 41 STAT. L., 1313.)

To all whom it may concern:

Be it known that I, LEOPOLD LISSE, a citizen of Germany, residing at Berlin, in Prussia, Germany, have invented certain new and useful Methods of Preparing Blasting Charges for Ignition (for which I have filed applications in Germany, October 4, 1915; Switzerland, September 30, 1919; Spain, March 11, 1920; Holland, June, 1916, and Hungary, June, 1916), of which the following is a specification.

The object of the present invention is a method by which it is possible to get the electrical igniting means for blasting by means of a liquefied gas, such as liquid air, ready for use before introducing the blasting charge or cartridge into the borehole. Therefore, in making use of this method, the whole time hitherto necessary for preparing and arranging the igniting means is saved and may be used for charging other boreholes with saturated or impregnated blasting cartridges.

It may happen that, when some time has expired, after disposing of several blasting charges, there will not be sufficient oxygen left for complete combustion of the oxidized constituents of the blasting charge. The consequences thereof is a diminishing of the explosive effect, and the afterdamp of the discharge becomes materially worse or more dense. Owing to this fact, up to the present, it was only possible to simultaneously blast so many boreholes, by means of liquid air as can be filled up or tamped and brought to detonation in about 5 to 10 minutes. Now, many mining works, collieries and other workings require the simultaneous disposal of a larger number of boreholes in order to prevent the blasting operation becoming too wearisome, tedious and wasting too much time.

Not only the introducing of the blasting charge into the borehole requires a rather long time, but also getting the igniting contrivance ready and plugging or tamping the boreholes. In order to ignite and discharge a larger number of blasting shots by means of quick matches or priming trains or cords, these must be of considerable length, so that all of them may be ignited with absolute safety. To bring about 10 blasting charges or shots to ignition, experience shows that about 3 to 4 minutes

will elapse, from the lighting of the first quick match till the detonation ensues.

Supposing that the blasting charges be ignited electrically, then the conducting priming wires, after tamping the borehole, must be connected, one behind another, or parallel to one another, and all properly be connected with one another and with the main priming wire or lead. This manipulation requires at least the same time as lighting the quick matches or priming cords or trains.

Now by the new method, forming the object of the present invention it will be possible to get the whole electric contrivance ready for igniting the fuses or primers in the blasting charges, before inserting said charges into the borehole. By employing the new method of blasting by means of liquefied air, the whole time that used hitherto to be required to prepare the elaborate contrivance for ignition, can now be utilized and turned to profitable account in charging other or new boreholes with saturated blasting cartridges.

The difference of the present method compared to the one that used to prevail consists in lodging the means and agents for ignition, such as a fuse primer or igniter, not inside the blasting charge itself but on the outside of it in connection with any other suitable body or substance.

The fuse primer or igniter may be introduced into, maintained and fixed firmly in the borehole with any other solid body of the transverse diameter of the borehole, for instance with a small bag filled with infusorial earth or with carbon, or otherwise inside a piece of wood pierced from end to end. Besides the fuse may be introduced by itself, maintained and attached firmly and lightly by fastening securely the conducting or priming wires. Also a short cartridge consisting of a solid blasting substance may be used as means of introduction. The fuse or the several ignitors must first be introduced or inserted into the corresponding boreholes with or without a locking device and then they are connected with the conducting or priming wires for ignition. Only at this moment are the boreholes supplied with the blasting charges saturated with liquid air or such like liquefied gases.

As experience has shown, this method also admits of the disposal or the exploding of blastholes by means of liquid air at two or more consecutive intervals of time. This object is attained by making use of differential initial priming fuses, having a slow or quick effect on being ignited electrically as, for instance fulminate of mercury tubes. The flash of an instantaneous electric fuse does not suffice by itself, to bring blasting cartridges saturated with liquid air to regular detonation.

The consecutive intervals of time in the blasting operations performed in the way as described above, are in themselves of very short duration, but thoroughly sufficient to dispose of, and to discharge with complete success, boreholes lying one behind another, when the blasting of the holes lying farther back is dependent and conditional upon the successful blasting of those lying in front.

The invention is illustrated in the accompanying drawing which shows how the igniting means and electric wires are made ready for the ignition of the charge or cartridge in the bore hole or holes and how the charges or cartridges themselves are inserted into the boreholes after the operations of placing the ignitors into the holes and connecting them to the electric circuits have been completed.

After the borehole is made a piece of wood *a* with the ignitor *c* is introduced into it.

The ignitor *c* with the electric leads *d* is thus in position. The leads *d* are then connected to the igniting circuit *e*. When these operations have been completed the cartridge *g* is also inserted into the borehole *d*.

The ignitor *c* may be held in position without the aid of a piece of wood by using an eyelet *f* to hold the wire *d* and the ignitor *c*.

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

1. The hereinafter described method of preparing for ignition blasting charges intended to be exploded with the aid of liquefied gases which consists in introducing the ignitor into the borehole, arranging the electric circuits necessary for the igniting operation, and subsequently placing the cartridge into position in the borehole.

2. The method of preparing for ignition blasting charges intended to be exploded in consecutive intervals of time with the aid of a liquefied gas, which consists in using for the initial ignition substances varying largely in their explosive or bursting effect.

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

LEOPOLD LISSE.

Witnesses:

PETER MIBFEST,
FRITZ SHUDTSAUF.