

WASC 390

Improvements in the
firing of explosive
compounds

Patent 3115 1868

FA Abel



A.D. 1868, 10th OCTOBER. N° 3115.

Firing Explosive Compounds.

LETTERS PATENT to Frederick Augustus Abel and Edwin Ormond Brown, both of the Royal Arsenal, Woolwich, in the County of Kent, for the Invention of "IMPROVEMENTS IN THE MODE OF AND APPARATUS FOR FIRING EXPLOSIVE COMPOUNDS."

Sealed the 6th April 1869, and dated the 10th October 1868.

PROVISIONAL SPECIFICATION left by the said Frederick Augustus Abel and Edwin Ormond Brown at the Office of the Commissioners of Patents, with their Petition, on the 10th October 1868.

We, FREDERICK AUGUSTUS ABEL and EDWIN ORMOND BROWN, both
5 of the Royal Arsenal, Woolwich, in the County of Kent, do hereby
declare the nature of the said Invention for "IMPROVEMENTS IN THE MODE
OF AND APPARATUS FOR FIRING EXPLOSIVE COMPOUNDS," to be as follows:—

Our Invention relates to a new mode of exploding gunpowder,
gun cotton, or pyroxiline, gun sawdust, or the compound know as
10 "Schultze's powder," and other explosive mixtures or compounds.

Abel & Brown's Improvements in Firing Explosive Compounds.

It is well known that when gunpowder, gun cotton, gun sawdust, or the compound known as "Schultze's powder," or explosive compounds, such as the mixtures of chlorate of potash or nitrate of potash with the prussiates of potash, with metallic sulphides or sulphur, or with tannin, resin, or other solid vegetable substances, are ignited in the open air by 5 means of a highly heated body or flame, they burn without producing any violent explosion, and that it is necessary in order to develop their explosive action when thus inflamed to confine them in receptacles such as shells, or to enclose them in bore holes or blast holes by the well-known methods of tamping. 10

Now we have discovered that if any of the aforesaid explosive substances are subjected to the concussion produced by the explosion in contiguity or in actual contact with them of even a small quantity of a powerfully detonating substance, such as the fulminate of mercury, they explode instantaneously and with violence, even if they are quite freely 15 exposed to the air, and that they do not therefore require confinement in strong cases or by tamping in bore holes to develop their explosive and destructive effects. The way in which we apply this fact to the violent explosion of gunpowder, gun cotton, gun sawdust, and other explosive compounds, is as follows:—A small cylinder or tube, closed at one end 20 and consisting of wood, paper, papier maché, cardboard, or metal, is charged with a small quantity of fulminate of mercury, say, from ten to thirty grains, if a metal tube is employed. A loose plug of gun cotton is inserted over the fulminate, so as to confine the latter in the closed end of the tube; the open end is then closed with a piece of thin paper, 25 which may be varnished to exclude moisture. Any other convenient method of closing the tube may however be used. To employ these tubes or detonators for exploding gunpowder, gun cotton, or other explosive substances, a piece of ordinary mining fuze is inserted into the open end of the tube from which the covering has been removed, and the 30 tube is firmly attached to the fuze by means of a pair of pliers. The fuze thus prepared is then either inserted into or placed upon the charge to be exploded, care being taken that only the detonator is in contact with the charge.

Electric fuzes may also be applied to explode gunpowder, gun cotton, 35 and the other explosive substances by detonation; and for this purpose it is necessary to replace the ordinary priming charge of gunpowder usually contained in such fuzes by a priming charge of powerfully

Abel & Brown's Improvements in Firing Explosive Compounds.

detonating powder, such as the fulminate of mercury, from 10 to 50 grains of the powder being required, according to the construction of the particular electric fuze.

We are aware that it has been previously proposed to apply a
5 detonating fuze or to attach a detonating cap to the ordinary mining fuze for the purpose of exploding nitro-glycerine and the preparations of that substance which are known as "dynamite," the employment of such arrangement being necessary in order to develop the explosive powers of those substances. But the producing a violent explosion of
10 gunpowder, gun cotton, and other explosive compounds (excepting nitro-glycerine and "dynamite") when in an unconfined state, or when enclosed only in weak receptacles by means of a concussion produced by the explosion of a charge of detonating powder, according to our present Invention, has never before been effected.

15 SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Frederick Augustus Abel and Edwin Ormond Brown in the Great Seal Patent Office on the 10th April 1869.

TO ALL TO WHOM THESE PRESENTS SHALL COME, we, FREDERICK AUGUSTUS ABEL and EDWIN ORMOND BROWN, both of the Royal Arsenal,
20 Woolwich, in the County of Kent, send greeting.

WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Tenth day of October, in the year of our Lord One thousand eight hundred and sixty-eight, in the thirty-second year of Her reign, did, for Herself, Her heirs and
25 successors, give and grant unto us, the said Frederick Augustus Abel and Edwin Ormond Brown, Her special licence that we, the said Frederick Augustus Abel and Edwin Ormond Brown, our executors, administrators, and assigns, or such others as we, the said Frederick Augustus Abel and Edwin Ormond Brown, our executors, adminis-
30 trators, and assigns, should at any time agree with, and no others, from time to time and at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVEMENTS IN THE
35 MODE OF AND APPARATUS FOR FIRING EXPLOSIVE COMPOUNDS," upon the con-

Abel & Brown's Improvements in Firing Explosive Compounds.

dition (amongst others) that we, the said Frederick Augustus Abel and Edwin Ormond Brown, our executors or administrators, by an instrument in writing under our or their hands and seals, or under the hand and seal of one of us or them, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great Seal Patent Office within six calendar months next and immediately after the date of the said Letters Patent. 5

NOW KNOW YE, that I, the said Frederick Augustus Abel, on behalf of myself and the said Edwin Ormond Brown, do hereby declare the nature of the said Invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof, that is to say:— 10

Our Invention relates to a new mode of exploding gunpowder, gun cotton, or pyroxyline, gun sawdust, or the compound known as "Schultze's powder," and other explosive mixtures or compounds. 15

It is well known that when gunpowder, gun cotton, gun sawdust, or the compound known as "Schultze's powder," or explosive compounds, such as the mixtures of chlorate of potash or nitrate of potash with the picrates of potash or ammonia, the prussiates of potash with metallic sulphides or sulphur, or with tannin, resin, or other solid vegetable substances, are ignited in the open air by means of a highly heated body or flame, they burn without producing any violent explosion, and that it is necessary in order to develop their explosive action when thus inflamed to confine them in receptacles such as shells, or to enclose them in bore holes or blast holes by the well-known methods of tamping. 20 25

Now we have discovered that if any of the aforesaid explosive substances are subjected to the concussion produced by the explosion in contiguity to or in actual contact with them of even a small quantity of a powerfully detonating substance, such as the fulminate of mercury, they explode instantaneously and with violence, even if they are quite freely exposed to the air, and do not therefore require confinement in strong cases or by tamping in bore holes to develop their explosive and destructive effects. The way in which we apply this fact to the violent explosion of gunpowder, gun cotton, gun sawdust, and other explosive compounds, is as follows:—A small cylinder or tube, closed at one end and consisting of metal, wood, paper, papier maché, cardboard, or a com- 30 35

Abel & Brown's Improvements in Firing Explosive Compounds.

5 bination of these, is charged with a small quantity of fulminate of mercury, say, from ten to thirty grains, if a metal tube is employed. A loose plug of gun cotton is inserted over the fulminate so as to confine the latter in the closed end of the tube. The open end is then closed
10 with a piece of thin paper, which may be varnished to exclude moisture. Any other convenient method of closing the tube may however be used. To employ these tubes or detonators for exploding gunpowder, gun cotton, or other explosive substances, a piece of ordinary mining fuze is inserted into the open end of the tube from which the covering has been
15 removed, and the tube is firmly attached to the fuze by nipping the latter upon the former by means of a pair of pliers, or by securing it in any other convenient manner. The fuze thus prepared is then either inserted into or placed upon the charge to be exploded, care being taken that only the detonator is in contact with the charge.

15 Electric fuzes may also be applied to explode gunpowder, gun cotton, and the other explosive substances by detonation; and for this purpose it is necessary to replace the ordinary priming charge of gunpowder usually contained in such fuzes by a priming charge of powerfully
20 detonating powder, such as the fulminate of mercury, from 10 to 50 grains of the powder being required according to the construction of the particular electric fuze employed, the particular detonating powder used, and according to the particular explosive agent to be fired by the said fuze.

The said violent explosion of the gunpowder, gun cotton, or other
25 explosive compounds may be effected as before stated either when these materials are quite unconfined or when only partially confined, as in blast holes, or open receptacles, or when enclosed in weak receptacles, such as thin cases of wood or sheet metal, waterproof or other bags or vessels of glass, earthenware, or other materials, which receptacles or
30 vessels may simply be placed against or upon the object to be acted upon by the explosion.

We are aware that it has been previously proposed to apply a detonating fuze or to attach a detonating cap to the ordinary mining fuze for the purpose of exploding nitro-glycerine, and the preparations of
35 that substance, which are known as "dynamite," the employment of such arrangement being necessary in order to develop the explosive powers of those substances. But what we claim is,—

First. Producing a violent explosion of gunpowder, gun cotton, and

Abel & Brown's Improvements in Firing Explosive Compounds.

other explosive compounds (excepting nitro-glycerine and "dynamite") when in an unconfined state or when enclosed only in weak receptacles, by means of a concussion produced by the explosion of a charge of detonating powder.

Second. The employment for producing such violent explosions of a 5 fuze or detonating primer constructed for adaptation to the ordinary mining fuze, and charged with a detonating powder, substantially as herein-before described.

Third. The combination of a charge of detonating powder with an electric fuze for producing the violent explosions, as aforesaid. 10

In witness whereof, I, the said Frederick Augustus Abel, have hereunto set my hand and seal, this Ninth day of April, in the year of our Lord One thousand eight hundred and sixty-nine.

F. A. ABEL. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1869.