UNITED STATES PATENT OFFICE.

BENJAMIN C. PETTINGELL, OF VICTORIA, CANADA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO WILLIAM PARSONS SAYWARD, OF SAME PLACE.

EXPLOSIVE COMPOUND.

SPECIFICATION forming part of Letters Patent No. 525,996, dated September 11, 1894.

Application filed August 8, 1893. Serial No. 482,677. (No specimens.)

To all whom it may concern:

Be it known that I, BENJAMIN C. PETTINGELL, a subject of the Queen of Great Britain, residing at Victoria, British Columbia, Canada, have invented certain new and useful Improvements in Explosive Compounds; and I do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

My invention relates to that class of explosive compounds in which nitro-glycerin is combined with dry combustible gas-producing substances, in order to produce a powder having high explosive effects.

It consists in subjecting coal dust to a process similar to that which is employed in converting glycerin into nitro-glycerin, and then using the product as an absorbent base for nitro-glycerin explosive compound.

To make my absorbent base I take any soft gas-producing coal and reduce it to a highly pulverulent condition, so that it will resemble soot or lamp black. This can be accomplished in various ways, but I prefer to submit the coal to attrition in revolving cylinders, in which it will be reduced to a very fine dust. The ordinary bituminous coal of commerce, such as is used in the manufacture of illuminating gas, I have found to be the best suited for my purpose, but any mineral coal can be used with more or less beneficial effect. When the coal has been thus reduced to a highly pulverulent condition, so as to form a fine dust, I place it in an acid bath or menstruum, which is made up in the proportion of about two (2) parts of sulfuric acid to one (1) part of nitric acid, in which menstruum the coal dust is stirred until the same is thoroughly nitrated.

During the operation, care should be taken that the temperature of the bath or menstruum should not rise high enough to ignite the coal-dust, a condition which will usually occur at about 160° Fahrenheit. Within this limit, however, the higher the temperature of the bath during the treatment the more effective the process and the greater the nitration of the coal-dust. The temperature is prevented from rising too high by a cold water jacket in the usual way. Before subjecting the coal-dust to this bath I prefer to size it, by screening or otherwise, so that the particles will be of as nearly a uniform size and grade as possible, thus insuring a uniformity of treatment. The coal-dust should be well stirred so that every part of it is subjected to the chemical action of the bath. After the dust has been thoroughly stirred and agitated in the bath, the menstruum is drawn off, and the coal-dust left in the vessel is then washed two or three times in pure water until it is free from acid, and it is then dried. This treatment leaves a product that is explosive in itself, without leaving any residue, viz: nitrated coal-dust.

This prepared coal-dust forms the absorbent base of my explosive compound, which is made by adding the desired proportion of nitro-glycerin, which can vary from five to seventy per cent. according to the strength of explosive it is desired to produce.

In some cases I add a small percentage of nitrate of soda to the coal dust, in order to retard the action of the nitro-glycerin, but the coal-dust alone will form a sufficient base for all blasting purposes.

This explosive compound can be manufactured much more cheaply than the nitro-glycerin compounds heretofore used, because, first, the absorbent base is inexpensive, and second, it is explosive, so that a very much smaller per cent. of nitro-glycerin is required to produce a given effect, and it will be safer to handle because the absorbent character of the base is sufficient to take up and hold the small quantity of nitro-glycerin required to make it effective, and there is consequently no danger of separation.

This product from mineral coal-dust can also be substituted for vegetable charcoal in the manufacture of low grade powders, such as gunpowder and blasting powder, with highly beneficial effects.

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

An explosive compound composed of nitro-glycerin combined with nitrated coal-dust as an absorbent base, substantially as described.

BENJAMIN C. PETTINGELL.

Witnesses:
A. S. BARNEY,
CHAS. J. ARMBRUSTER.