

UNITED STATES PATENT OFFICE.

RUDOLF SJÖBERG, OF STOCKHOLM, SWEDEN, ASSIGNOR TO RUDOLPH ERICSSON, OF NEW BRITAIN, CONNECTICUT.

BLASTING COMPOUND.

SPECIFICATION forming part of Letters Patent No. 297,095, dated January 29, 1889.

Application filed June 23, 1887. Serial No. 242,718. (No specimens.) Patented in France April 20, 1886, No. 173,482; in England January 11, 1887, No. 448, and August 27, 1887, No. 11,653; in Germany February 1, 1887, No. 39,388; in Sweden February 4, 1887, No. 715, and August 19, 1887, No. 995; in Norway June 8, 1887, No. 402; in Russia June 19, 1887, No. 5,201; in Belgium June 30, 1887, No. 17,784, and September 18, 1887, No. 18,749, and in Spain November 20, 1887, No. 11,794.

To all whom it may concern:

Be it known that I, RUDOLF SJÖBERG, a citizen of Sweden, and resident of Stockholm, in the Kingdom of Sweden, have invented new and useful Improvements in Blasting Compounds, (which have been patented in the following countries, to wit: Sweden February 4, 1887, No. 715, and August 19, 1887, No. 995; France, April 20, 1886, No. 173,482; Germany, February 1, 1887, No. 39,388; England, January 11, 1887, No. 448, and August 27, 1887, No. 11,653; Norway, June 8, 1887, No. 402; Spain, November 20, 1887, No. 11,794; Russia, June 19, 1887, No. 5,201; Belgium, June 30, 1887, No. 17,784, and September 18, 1887, No. 18,749,) of which the following is a specification.

The object of my invention is to produce a powerful explosive compound for blasting and mining purposes, bombs, and other explosive projectiles, &c., and which shall be safe to handle, not liable to spontaneous ignition or accidental explosion (for instance, by shaking or concussion due to falling against hard surfaces—such as iron or stone,) not liable to freeze, not explosible on ignition by flame, and explosible only by percussion-cap and when within rigid inclosure. For this purpose a number of dangerous matters which enter as elements in other blasting compounds are entirely absent in this—such as nitro-glycerine, nitro-cellulose, (gun-cotton,) nitro-benzole or nitro-benzine, or picrates.

The chief ingredients of my compound are an ammoniacal salt, a hydrocarbon, and chlorate of potash. The ammoniacal salt is either nitrate or oxalate of ammonia. If the nitrate is used, a part thereof is replaced with carbonate of ammonia. The hydrocarbon used is non-nitrated, and may be partly in liquid and partly in solid form or wholly solid. As liquid hydrocarbon I preferably use so-called "astral oil," and as solid hydrocarbon naphthaline, though other similar hydrocarbons—such as paraffine—may be used, observing only that the liquid hydrocarbon should be of such a kind as does not easily evaporate; hence benzine is not suitable.

The preparation or manufacture is as follows: The salts to be used should be finely pulverized, and must be well dried so as to be free from hygroscopic moisture. The solid hydrocarbon is first melted, and may be used alone, but is preferably mixed with the liquid hydrocarbon, being heated sufficiently for the purpose. This mixture is then divided in two unequal parts—one part, say, about two-thirds, and the other part one-third, of the whole. After this the ammonia, either in the form of nitrate or nitrate and carbonate, or, instead of both, the oxalate, is added to the aforesaid larger part (of two-thirds) of the hydrocarbon mixture and carefully mixed therein by stirring. To the aforesaid smaller part (of one-third) of the hydrocarbon, chlorate of potash is similarly mixed by stirring. The mixtures thus obtained are then mixed with each other, after which the blasting compound is ready.

The following is an example of proper proportions of the ingredients: Fifty parts nitrate of ammonia, five parts carbonate of ammonia, ten parts liquid hydrocarbon, five parts solid hydrocarbon, and thirty parts chlorate of potash; or, fifty parts oxalate of ammonia, ten parts liquid hydrocarbon, five parts solid hydrocarbon, and thirty-five parts chlorate of potash.

The proportions of the ingredients may of course be varied according to the purpose for which the compound is intended to be used—for instance, if for blasting or if for artillery service, &c. The following will serve as an example for such variations: Thirty to sixty parts nitrate of ammonia, one to five parts carbonate of ammonia, five to twenty parts liquid hydrocarbon, one to ten parts solid hydrocarbon, and five to thirty-five parts chlorate of potash.

This blasting compound cannot be exploded except within rigid inclosure—such as shells or other projectiles, or a hole bored in a rock—and then only by the use of a so-called "dynamite percussion-cap." In bored holes the percussion-cap is exploded by a fuse; but the blasting compound cannot be exploded by

fuse alone, the latter only being used to ex-
 plose the percussion-cap; nor can it be ex-
 ploded by concussion—such as blows against
 iron or stone. It will not freeze. It cannot
 5 be exploded by ramming it in a bore-hole,
 nor by the application of flame; but it may
 be ignited, in which case it will burn very
 slowly. It may be heated up to and above
 100° centigrade without danger of explosion.
 10 If a fuse is applied to ignite it without the
 use of percussion-cap, the fuse will burn out
 without igniting the powder. In order to ex-
 plose, it must be placed within a rigid inclos-
 ure, as before stated. It will not explode
 15 when placed loosely upon a rock. For use I
 put it up in cartridges. It will not explode
 under any circumstances in the open air,
 even if a dynamite percussion-cap is used;
 nor will it explode if strewn upon a red-hot
 20 iron plate, nor in a cartridge, unless the latter
 be placed within rigid inclosure in the ab-
 sence of air, as when used in bombs or other
 projectiles or in a rammed bore-hole, and

then only by percussion-cap ignited by fuse or electricity.

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

1. A blasting compound consisting of oxalate of ammonia, a non-nitrated hydrocarbon, 30 as naphthaline, and chlorate of potash, substantially as set forth.

2. A blasting compound consisting of oxalate of ammonia, a liquid non-volatile hydrocarbon, as astral oil, a solid hydrocarbon, as 35 naphthaline, and chlorate of potash, substantially as hereinbefore set forth.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 22d day of Febru- 40 ary, 1887.

RUDOLF SJÖBERG.

Witnesses:

NERE A. ELFWING,
HARALD FATTSTRÖM.