# UNITED STATES PATENT OFFICE.

CARL LAMM, OF STOCKHOLM, SWEDEN.

## EXPLOSIVE COMPOUND.

SPECIFICATION forming part of Letters Patent No. 455,217, dated June 30, 1891.

Application filed November 24, 1885. Serial No. 183,885. (Specimens) Patented in Sweden September 13, 1885, No. 329; in Belgium November 9, 1885, No. 70,796; in England November 10, 1885, No. 13,690; in France March 12, 1886, No. 174,713; in Norway March 13, 1886, No. 130; in Finland April 1, 1886, No. 257; in Italy April 17, 1886, No. 78; in Spain July 26, 1886, No. 5,793/8,931; in Portugal July 26, 1886, No. 1,266; in Russia December 31, 1886, No. 11,675; in New South Wales April 14, 1888, No. 619; in Tasmania April 25, 1888, No. 568/10; in Victoria April 28, 1888, No. 5,793; in South Australia May 22, 1888, No. 1,032; in New Zealand May 30, 1888, No. 3,014; in Natal July 17, 1888; in Cape of Good Hope July 21, 1888, No. 396/462; in Queensland February 20, 1889, No. 584, and in Austria-Hungary October 30, 1889, No. 14,457, No. 53,453, No. 22,289, and No. 53,455.

*To all whom it may concern:*

Be it known that I, CARL LAMM, of Stockholm, Sweden, have invented an Improvement in Explosive Compounds, (for which I have obtained patents in Sweden, No. 329, dated September 13, 1885; in Norway, No. 130, dated March 13, 1886; in Great Britain, No. 13,690, dated November 10, 1885; in Belgium, No. 70,796, dated November 9, 1885; in France, No. 174,713, dated March 12, 1886; in Italy, No. 78, dated April 17, 1886; in Spain, No. 5,793/8,931, dated July 26, 1886; in Portugal, No. 1,266, dated July 26, 1886; in Russia, No. 11,675, dated December 31, 1886; in Finland, No. 257, dated April 1, 1886; in Austria-Hungary, No. 14,457, No. 53,453, No. 22,289, and No. 53,455, dated October 30, 1889; in Natal, dated July 17, 1888; in Cape of Good Hope, No. 396/462, dated July 21, 1888; in New South Wales, No. 619, dated April 14, 1888; in Victoria, No. 5,793, dated April 28, 1888; in South Australia, No. 1,032, dated May 22, 1888; in Tasmania, No. 568/10, dated April 25, 1888, in New Zealand, No. 3,014, dated May 30, 1888, and in Queensland, No. 584, dated February 20, 1889;) and I do hereby declare the following to be a full, clear, and exact description of the same.

The well-known powerful explosive nitro-glycerine has been used extensively since its invention in 1847; but as it is highly dangerous, both in use and manufacture, as are also all explosives into which it enters as a constituent part, various attempts have been made to provide a powerful explosive which is less dangerous in its manufacture, transportation, and use.

The object of my invention is to provide such an explosive which does not possess the objectionable qualities of nitro-glycerine, and it is in the nature of a compound consisting of a nitrate (such as nitrate of ammonia, nitrate of potassa, nitrate of soda, or nitrate of baryta) and dinitro-benzine or dinitro-benzol mixed in the proportions hereinafter described, so that when exploded the hydrogen of the dinitro-benzine or dinitro-benzol burns and forms water, and the carbon of the same material forms carbonic acid at the expense of the oxygen contained in the nitrate conjointly with the oxygen contained in the dinitro-benzine. In compounding this mixture I have also had in view the protection of the nitrates from the influence of moisture, and for this reason the dinitro-benzine or dinitro-benzol, which is a solid, is pulverized, as is also the solid nitrate, and both are then mixed and heated by steam in suitable molds to 212° Fahrenheit, which causes the dinitro-benzine or dinitro-benzol to melt between 176° and 212° Fahrenheit and to completely envelope the particles of saltpeter or other nitrate used. The mass solidifies in cooling, and is molded into cartridges or bodies of any suitable shape, or it may be pulverized or granulated.

I have found the following proportions of ingredients to give the best results: dinitro-benzine, one part, and nitrate of ammonia, at least 1.9 part; dinitro-benzine, one part, and nitrate of potassa, 0.96 part; dinitro-benzine, one part, and nitrate of baryta, 1.24 part; dinitro-benzine, one part, and nitrate of soda, 0.81 part.

The above proportions of the ingredients are so selected as to yield or form carbonic oxide and water when the explosion takes place.

If the proportion of saltpeter or other nitrate be increased about three times, carbonic acid and water will be formed, which give the best results for mining purposes.

The advantages which my explosive possesses are as follows:

First. It cannot be exploded by means of a shock or blow.

Second. It cannot be ignited by fire.

Third. It has considerably more power than other high explosives.

Fourth. It does not congeal at a low temperature.

Fifth. Previous to being used it may be pulverized without danger.

Sixth. It can be safely transported, used, and stored.

Seventh. It can be used to advantage in coal-mines in place of gunpowder, and from a fourth to a fifth of the quantity only is required.

I am aware of United States Patent to Volney, No. 157,143, and I do not claim anything in the same. Neither do I claim anything described in British Patents No. 2,422, of 1876; No. 2,775, of 1880, nor No. 2,139, of 1885.

What I claim is—

1. An explosive compound composed of a nitrate salt and dinitro-benzine or dinitro-benzol, substantially as and for the purpose specified.

2. An explosive compound composed of nitrate of ammonia and dinitro-benzine or dinitro-benzol, substantially as described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

CARL LAMM.

Witnesses:

NERE A. ELFWING,

E. H. BRUHN.