UNITED STATES PATENT OFFICE.

HENRY ORTH, OF WASHINGTON, DISTRICT OF COLUMBIA, ADMINISTRATOR OF BELA BRONCS, DECEASED.

EXPLOSIVE COMPOUND.

SPECIFICATION forming part of Letters Patent No. 421,753, dated February 18, 1890.

Application filed October 13, 1888. Serial No. 288,011. (Specimens.) Patented in Austria-Hungary January 31, 1884, No. 41,601 and No. 2,061, June 19, 1884, No. 9,858 and No. 26,169, and September 16, 1884, No. 11,989 and No. 42,284; in France October 25, 1884, No. 165,010; in Belgium October 25, 1884, No. 66,699; in Luxemburg October 25, 1884, No. 452; in England October 25, 1884, No. 14,140; in Germany October 26, 1884, No. 32,891; in Italy December 6, 1884, XVIII, 17,500, XXXIV, 451; in Spain March 11, 1885, No. 6,596; in Sweden April 9, 1885, No. 315; in Portugal October 13, 1886, No. 1,076, and in Canada October 23, 1886, No. 25,188.

To all whom it may concern:

Be it known that BELA BRONCS, (deceased,) late a subject of the Emperor of Austria, and a resident of the city of Vienna, in the Empire of Austria, did invent a certain new and useful Explosive Salt, (for which Letters Patent were issued to him in the following countries: In Austria-Hungary January 31, 1884, No. 41,601 and No. 2,061, June 19, 1884, No. 9,858 and No. 26,169, September 16, 1884, No. 11,989 and No. 42,284; in Germany October 26, 1884, No. 32,891; in France October 25, 1884, No. 165,010; in Belgium October 25, 1884, No. 66,699; in Luxemburg October 25, 1884, No. 452; in England October 25, 1884, No. 14,140; in Italy December 6, 1884, Vol. XVIII, 17,500, and Vol. XXXIV, 451; in Spain March 11, 1885, No. 6,596; in Portugal October 13, 1886, No. 1,076; in Sweden April 9, 1885, No. 315, and in Canada October 23, 1886, No. 25,188,) and I, HENRY ORTH, a citizen of the United States, residing at the city of Washington, District of Columbia, administrator of the estate of the said BELA BRONCS, do hereby declare that the following is a full, clear, and exact description of the invention of the said BELA BRONCS, which will enable others skilled in the art to which it appertains to make and use the same.

The invention relates to a new explosive agent; and it consists in a double picrate and such double picrate in combination with nitrated naphthaline, substantially as hereinafter described, and as set forth in the claims.

The explosives hitherto employed for blasting and other purposes, especially nitro-glycerine and the nitro-cellulose compounds, have the disadvantage not only in exerting a crushing power upon the material acted upon, but also in developing poisonous gases—as products of combustion—and are for this reason objectionable, more especially for quarrying or mining purposes. These disadvantages, to which may be added the danger inherent to their preparation or manufacture, storage and handling, gave rise to many attempts to produce an explosive equally as efficient, but free from such dangers and disadvantages. To these ends the alkali picrates have been largely experimented with, and potassium picrate has been especially recommended for use in explosives. Double salts have also been proposed—such as sodium picrate with magnesium or with an oxide or protoxide—without, however, attaining the desired results. The great disadvantage of all these salts lies in the fact that they are very sensitive to shocks or blows on the one hand, while on the other the explosive power or effect of these salts is deficient.

The said BRONCS discovered that double picrates can be obtained, by means of which all the disadvantages referred to may be effectually avoided and an explosive of greater efficiency even than the nitro-glycerine or nitro-cellulose compounds obtained. These double picrates were heretofore unknown, so far as he was aware, and they were composed of a crystalline combination of sodium picrate with barium or lead picrate. Said BRONCS also discovered that when nitrated naphthaline is combined with these double salts their combustion may be materially retarded. Good results are obtained with the double picrate of barium and sodium (trinitrophenate of barium and sodium,)

$$2(C_6H_2(NO_2)3O)Ba+3(C_6H_2(NO_2)3NaO)+10H_2O,$$

or with the double picrate of lead and sodium (trinitrophenate of lead and sodium)

$$2(C_6H_2(NO_2)3O)Pb+3(C_6H_2(NO_2)3NaO)+10H_2O.$$

These double salts said BRONCS obtained as follows: He dissolved three equivalents of sodium picrate in hot water and added thereto one equivalent of barium or lead picrate, according as the one or the other double salt was to be obtained, and allowed the salt to crystallize out. The separation of the salt from the solution may be accelerated by the addition of a small amount of caustic soda or by evaporating the solution to about one-third its volume. The lye is then decanted from the salt and the latter is dried in any suit-

able manner—as, for instance, in a centrifugal machine. By the process described a series of double salts may be obtained by combining sodium picrate with other picrates. Said BRONCS also discovered that the combustion of the double salt may be materially retarded by combining therewith nitrated naphthaline.

The nitrated naphthaline may be obtained by treating naphthaline with nitrate of soda. In practice he preferably employed highly-nitrated naphthaline by treating one part of naphthaline and two parts of melted nitrate of soda with two and one-half parts of concentrated sulphuric acid for about two hours, a temperature of about 90° centigrade, the product being dinitronaphthaline. To this product he added, further, four parts of nitrate of soda and five and one-half parts of concentrated sulphuric acid and heated the mixture to about 90° to 100° centigrade for about ten hours, the product obtained being a highly-nitrated naphthaline composed of di, tri, and tetra nitronaphthaline combinations and sulphate of soda is obtained as a by-product. The remaining acid is removed by lixiviation in cold or in warm water. These pure and nitrated naphthalines influence the process of combustion of the double salts referred to in two ways—namely, in that any carbon that may be combined with the double salt will be oxidized by the large proportion of oxygen they contain and thereby materially influence the resultant gases, and in that the considerable proportion of nitrogen in the nitrated naphthaline acts as a retarding agent to retard or check the combustion and consequent evolution of gases in a most advantageous manner.

Having described the invention, what is claimed is—

1. The herein-described double picrate consisting of sodium picrate, combined with barium or lead picrate, substantially as and for the purposes specified.

2. The herein-described double salt of sodium and barium or lead picrates, in combination with nitrated naphthaline, substantially as and for the purposes specified.

HENRY ORTH,
Administrator of the Estate of Bela Broncs.

Witnesses:
J. THOMSON CROSS,
A. V. WEAVER.