

UNITED STATES PATENT OFFICE.

LEAVITT N. BENT AND HERBERT TALLEY, OF CARTHAGE, MISSOURI, ASSIGNORS TO
INDEPENDENT POWDER COMPANY OF MISSOURI, OF JOPLIN, MISSOURI, A COR-
PORATION OF MISSOURI.

EXPLOSIVE.

943,589.

Specification of Letters Patent.

Patented Dec. 14, 1909.

No Drawing.

Application filed April 17, 1909. Serial No. 490,600.

To all whom it may concern:

Be it known that we, LEAVITT N. BENT and HERBERT TALLEY, citizens of the United States, residing at Carthage, county of Jasper, and State of Missouri, have invented a certain new and useful Explosive, of which the following is a specification.

Our invention relates to explosives.

Our object is the provision of an explosive possessing great strength, which will produce but little flame and noxious gases so that the explosive is particularly safe for use in gaseous and dusty mines.

The object of our invention is carried out by our discovery that a mixture of ammonium nitrate, black oxid of manganese, "blue powder" or zinc dust with or without the addition of another oxidizable substance, such as charcoal, starch, or the like will produce an explosive having the foregoing characteristics.

The foregoing ingredients may be mixed in any well known or preferred manner and their proportions may be varied according to the strength or sensitiveness desired in the resulting explosive, but the preferable limits of percentages of the various ingredients are as follows:

Ammonium nitrate----- 50% to 80%
Black oxid of manganese----- 7% to 35%
"Blue powder" or zinc dust-- 8% to 15%

The zinc dust may be either pure metallic zinc or the so-called "blue powder" which is a by-product from zinc smelters and consists primarily of metallic zinc with a small proportion of zinc oxid in the form of an impalpable powder requiring no grinding before being used in our explosive. Its cost is so low that it can be profitably used in commercial explosives. The zinc fulfils the usual function of an oxidizable metal of high specific conductivity.

The zinc oxid has the property of being antacid, thus causing our explosive to comply with the requirements of the rules of the Interstate Commerce Commission and of the Bureau of Safe Transportation of the American Railway Association.

Nitro-compounds of organic hydrocarbons of either alcoholic, aromatic, phenol, or other groups may be used in conjunction with the above ingredients, in such proportions as may be desired according to the explosive

which is to be made in order to increase the sensitiveness to detonation and also to reduce the tendency of the said mixture to absorb moisture from the air.

In the explosive, the manganese dioxid acts both as an oxidizing agent and as an aid to the propagation of explosive reaction throughout the entire mass.

The explosive has been found in practice to possess high explosive power with the production of a very small quantity of flame and noxious gases, conducing to its use in gaseous and dusty mines.

The following are examples of our explosive:

Example No. 1.

Ammonium nitrate----- 50% to 80%
Sodium nitrate----- 10% to 20%
"Blue powder" or zinc dust-- 8% to 25%
Starch----- 2% to 10%

Example No. 2.

Ammonium nitrate----- 50% to 80%
Black oxid of manganese----- 7% to 20%
"Blue powder" or zinc dust-- 8% to 25%
Pulverized charcoal----- 1% to 10%

Example No. 3.

A. Of the alcoholic group:
Ammonium nitrate----- 50% to 80%
Black oxid of manganese----- 7% to 20%
"Blue powder" or zinc dust-- 8% to 25%
Nitro-glycerin (tri-nitroglycerol)----- 2% to 10%

B. Of the aromat group:
Ammonium nitrate----- 50% to 80%
Black oxid of manganese----- 7% to 20%
"Blue powder" or zinc dust-- 8% to 25%
Mono-nitro naphthalene----- 2% to 10%

C. Of the phenol group:
Ammonium nitrate----- 50% to 80%
Black oxid of manganese----- 7% to 20%
"Blue powder" or zinc dust-- 8% to 25%
Picric acid----- 2% to 10%

Example No. 4.

A. With the addition of nitroglycerin:
Nitrate of ammonia----- 50 % to 80 %
Black oxid of manganese-- 7 % to 20 %
Finely divided zinc----- 7.2% to 23.5%
Oxid of zinc----- 0.8% to 2.5%
Nitroglycerin----- 2 % to 10 %

B. Without the addition of a nitro compound:

Nitrate of ammonia -----	50	% to 80	%
Black oxid or manganese---	7	% to 20	%
5 Finely divided zinc-----	7.2	% to 23.5	%
Oxid of zinc-----	0.8	% to 2.5	%

Having thus described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. An explosive comprising ammonium nitrate, another solid inorganic oxidizing agent, and comminuted zinc.

2. An explosive comprising ammonium nitrate, manganese dioxid, and comminuted zinc. 15

3. An explosive comprising ammonium nitrate, dioxid of manganese, comminuted zinc, and a nitrated compound.

In testimony whereof we hereunto affix our signatures in presence of two witnesses. 20

LEAVITT N. BENT.
HERBERT TALLEY.

Witnesses:

E. H. LANIER,
V. P. ROAD.