UNITED STATES PATENT OFFICE.

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EXPLOSIVE.

957,307. Specification of Letters Patent. Patented May 10, 1910.

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To all whom it may concern:

Be it known that I, CONRAD PAUL HUBERT CLAESSEN, a subject of Prussia, residing in Berlin, Germany, have invented a new and useful Improvement in Explosives; and I do hereby declare the following to be a full, clear, and exact description of the same.

As is known anilin enters into fixed, stable compounds with various inorganic salts such as sulfates, nitrates and chlorids of the alkaline earths and heavy metals.

It is a surprising fact that salts which are *per se* very hygroscopic more or less lose their capacity for attracting water by treating them with anilin. Thus for example, calcium chlorid or aluminium nitrate are converted into a dry powder merely by mixing them with anilin. Experiments have demonstrated that the anilin-metallic salt compounds are not only adapted for use as carbon vehicles for explosive mixtures, but that they also exert a favorable action in rendering them weather proof.

Of the numerous experiments carried out the following may be given by way of example:

(1) 90% of ammonium nitrate, 10% of chlorid of calcium-anilin. The explosive gave, examined by the Trauzl test, following the norms stated in the 5th international congress for applied chemistry 290 cm. expansion. 580 grams can be safely used without danger of igniting any gases which may exist in the mine.

(2) 95% of ammonium nitrate, 5% of sulfate of copper-anilin, explosive force, 302 ccm.; 600 grams can be used without danger of igniting any gases which may exist in the mine.

(3) 90% of ammonium nitrate, 10% of oxalate of copper-anilin. Explosive force, 310 ccm.; 610 grams can be safely used without danger of igniting any gases which may exist in the mine.

(4) 95% of ammonium nitrate, 5% of acetate of copper-anilin. Explosive force, 290 ccm.; 600 grams can be safely used without danger of igniting any gases which may exist in the mine. The formula for copper-oxalate-anilin is

$$CuC_2O_4.C_6H_5NH_2.$$

The formula for copper-acetate-anilin is:

$$(C_2H_3O_2)Cu.C_6H_5.NH_2.$$

(5) 92.5% of ammonium nitrate, 2.5% of sugar, 5.0 % of sulfate of copper-anilin. Explosive force, 320 ccm.; 600 grams can be safely used without danger of igniting any gases which may exist in the mine.

(6) 70% of ammonium nitrate, 20% of potassium nitrate, 10% of sulfate of copper-anilin. Explosive force, 280 ccm.; 675 grams can be safely used without danger of igniting any gases which may exist in the mine.

Applicant has manufactured a sulfate of copper-anilin with 4 molecules of anilin. Beilstein refers to such a compound with only 2 molecules. Copper-sulfate-anilin is made with 4 molecules of anilin, by dissolving 1 kg. of copper sulfate in 10 liters of water, and mixing it with the equivalent quantity of anilin, viz:—with 1330 grams of anilin. The combination precipitates as a dark green, flaky powder, which is insoluble in water. This is filtered out and dried at a low temperature. The use of oxalate of copper-anilin and nitrate of aluminium-anilin forms an important part of the present invention. A formula for aluminium nitrate anilin is—

$$Al(NO_3)_3C_6H_5NH_2.$$

As a sample of an explosive made with aluminium nitrate anilin, the following proportions may be taken:

Aluminium nitrate	80%
Aluminium nitrate anilin	15%
Sugar	5%

10 grams of this explosive tested in the Trauzl lead cylinder give an expansion of 235 ccm. and, if it is exploded in fire-damp mines, it is safe up to a charge of 600 grams.

It is apparent from the above that the introduction of anilin metallic compounds has provided a fresh group of explosives, which, apart from their novelty, present many advantages as compared with other explosive mixtures.

The method of manufacture is very simple; the constituents are merely thoroughly triturated in a ball mill, after which the resultant mixture is ready for packing and constitutes a dry powder forming a very compact charge with a good capacity for detonation and storage.

All the above-mentioned explosive mixtures detonate with explosive cap No. 3, but it is best in practice to use cap No. 8.

I claim—

1. A waterproof blasting explosive compound composed of an intimate mixture of ammonium nitrate and a compound of anilin with an inorganic metallic salt, substantially as specified.

2. A waterproof blasting explosive compound composed of an intimate mixture of ammonium nitrate, a nitrate of an alkaline metal and a compound of anilin with an inorganic metallic salt, substantially as specified.

3. A waterproof blasting explosive, composed of a mixture of ammonium nitrate, potassium nitrate and a compound of anilin with an inorganic metallic salt, substantially as specified.

In testimony whereof, I have signed my name to this specification in the presence of two subscribing witnesses.

CONRAD PAUL HUBERT CLAESSEN.

Witnesses:

WOLDEMAR HAUPT,

HENRY HASPER.