

# UNITED STATES PATENT OFFICE.

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## IMPROVED GUNPOWDER, MINING-POWDER, &c.

Specification forming part of Letters Patent No. 42,047, dated March 22, 1864.

*To all whom it may concern:*

Be it known that I, H. HOCHSTÄTTER, of the Grand Duchy of Hesse-Darmstadt, in Germany, have invented a new and Improved Mode of Making Gunpowder called "R K R" Gunpowder; and I do hereby declare that the following is a full and exact description of the said invention.

I. As regards the qualities and advantages of the gunpowder, I beg to state that neither brimstone nor any obnoxious matters are employed in the composition. It has no relation with cotton gunpowder. The ingredients are to be had anywhere, and some of them are even exported from America. The making of the powder is free from danger and performed in one to two hours in any place, on board a ship, &c. No powder-mills required any more. It is neither subjected to be affected by humidity or heat, supports a greater pressure and friction than common gunpowder, and an explosion is impossible without application of fire. It don't ignite even at 300° Celsius. The ignition is the same as of common powder, either by percussion-caps, or needles, &c. It soils and heats the barrel less than other powder. Its force is such that a common musket that loads four and a half grams of other powder only requires a cartridge of three and a half grams of the new, and for improved fire-arms two grams of the new powder have the same effect as four grams of the common. The same advantage shows itself in its use for artillery, mining, and blasting purposes. It is not subjected to spoiling, and is easily to be kept on store. The transport is free from danger. The surety and steadiness of the shot are perfect, especially the heating of the barrel after the shot is essentially less than with common powder, and in a proportion of one to two. The recussion (kicking) is less, the report weaker, and the smoke less. It leaves no residue after the shot, so that the barrel after a round of five hundred shots and more is almost just as clean as after the first and second shots. It don't damage the gun. The price is the same in Germany as of other powder. The minor quantity, however, required renders the cartridge cheaper, and allows greater quantities to be borne by the ammunition-trains, &c.

II. As regards manufacturing the powder:

*Directions for manufacturing the R K R gunpowder.*—Put into a cooking-vessel thirty-eight parts, in weight, of pure water; two parts, in weight, of finely-pulverized charcoal, which are to be boiled together, so that the charcoal becomes wholly diffused in the boiling water. As soon as this is done add twenty parts, in weight, of chlorate of potash, (*Chlorsaures kali*), six parts, in weight, of mixture A, (see below,) which is soon dissolved when stirred up awhile. By this addition the boiling is interrupted, therefore the whole compound must be brought again in a state of boiling, and then add thereto seven parts, in weight, of fine well-sifted sawdust of beach, oak, or other similar wood, and then boil together again so that the wood becomes thoroughly soaked and becomes a part of the solution. The mixture A, referred to above, consists of ten parts, in weight, of half-calcined sea-grass; five parts, in weight, of finely-pulverized stone-coal. While the foregoing operations are being performed an iron pan is to be strongly heated, and then the whole wood-impregnated mass is to be poured into the same. The mixture is then to be often stirred, so as to promote uniform evaporation, and so soon as the water has somewhat disappeared the vessel must be put on a less-heated plate or fire for the purpose of safely and entirely drying the powder.

The making of the powder in the manner described is entirely free from danger, as everything is prepared in a wet way. The pan for the purpose of evaporating can be strongly heated so long as the mixture remains moist. As soon, however, as it begins to show the least tendency to a dryness the pan must be taken from the strongly-heated stove, fire-place, or plate and put on one less heated.

The mixture A can be replaced by the following, to the proportions mentioned of others, viz: first, ten parts, in weight, of nitrate of soda, two parts, in weight, of pulverized stone-coal; second, ten parts, in weight, of nitrate of lead, two parts, in weight, of pulverized stone-coal; third, ten parts, in weight, of saltpeter, two parts, in weight, of pulverized stone-coal.

In the mixture A charcoal may be used instead of stone-coal; but the latter is preferable.

*Directions for making the R R gun and mining*



*powder with fire.*—Put into a cooking-vessel twenty parts, in weight, of water and one part, in weight, of pulverized charcoal, which are to be boiled together so that the charcoal becomes wholly diffused in the boiling water. Then add ten parts, in weight, of chlorate of potash, ( $\text{K}\text{aO}\text{ClO}_3$ .) Then boil again and add five parts, in weight, of half-calcined sea-grass, (*Barilla*), and three-fourths part, in weight, of pulverized stone-coal. By these additions the boiling is interrupted, therefore the whole compound is to be brought again to a boiling state. Then add thereto four parts, in weight, of fine well-sifted sawdust of beech, oak, or other similar wood, and then boil together again for five minutes, or until the wood is thoroughly soaked and becomes a part of the solution.

The five parts of sea-grass mentioned above can be replaced by, first, five parts, in weight, of carbonate of soda, ( $\text{NaOCO}_2$ ), or, second, four parts, in weight, of nitrate of lead, ( $\text{PbONO}_5$ ), or, third, four parts, in weight, of saltpeter, ( $\text{K}\text{aONO}_5$ , or  $\text{NaONO}_5$ .)

The four parts, in weight, of sawdust can be replaced by, first, four parts, in weight, of dried old coffee-grounds, or, second, three and one-half parts, in weight, of grounds (like coffee) of parched wheat.

While the foregoing operations are being performed an iron pan is to be strongly heated, and then the whole solution is to be poured into the same. The mixture is then to be often stirred so as to promote uniform evaporation, and so soon as the water has somewhat disappeared the vessel must be put on a less-heated plate or fire for the purpose of safely and entirely drying the powder.

The making of the powder in this manner is entirely free from danger, as everything is prepared in a wet way. The pan for the purpose of evaporating can be strongly heated so long as the mixture remains moist. As soon, however, as it begins to show the least tendency to a dryness the pan must be taken from the strongly-heated stove, fire-place, or plate and put on one less heated.

*Directions for making the R D gunpowder without the aid of fire.*—First, mix thoroughly together in a mortar, (A,) two parts, in weight, of fine wheat-flour, ten parts, in weight, of chlorate of potash; second, mix thoroughly in another mortar, (B,) one part, in weight, of pulverized stone-coal, one part, in weight, of pulverized charcoal. After this has been done then mix thoroughly together, also in a mortar, the above-prepared two mixtures A and B. When this has been done add three parts, in weight, of pure water, and then the entire compound is to be well worked together with the water, which will slightly moisten the same. When this has been done the whole, made into the form of a brick or a flat cake, is to be placed in a linen or cotton cloth and well wrapped or folded, and then pressed in a screw or other press. The cloth is then to be taken off, when the mass will be like a fresh

brick, slightly damp, and liable to break into several parts when handled. The mass is then to be placed in a well-dried or even slightly-heated wire sieve, and then to be rubbed by the hand gently back and forward, so as to cause the material to pass through the sieve in small angular, irregular grains. Under the sieve is to be placed a flat-bottomed iron pan to receive the grains as they fall. When all have passed through the sieve the pan is to be placed on a porcelain or other moderately-heated stove, in order that the grains may thoroughly dry. When this is accomplished brush the grains to and fro with the feathered end of a goose-quill. When this is done the R D gunpowder is perfect and fit for use.

This description is for making the powder in small quantities of one or two cartridges at a time. For large quantities more extensive apparatus must be used.

*Directions for making R D D gun and mining powder without the use of fire.*—First, mix thoroughly together in a mortar, (A,) two and one-half parts, in weight, of fine wheat-flour, ten parts, in weight, of chlorate of potash, (*Chlorsaures kali*;) second, mix thoroughly in another mortar, (B,) one-half to one part, in weight, of double carbonate of soda, (*Doppelt kohlensaures natron*), five parts, in weight, of saltpeter, one and one-half part, in weight, of pulverized stone-coal, one part, in weight, of pulverized charcoal. After this has been done then mix thoroughly together, also in a mortar, the above-prepared two mixtures, A and B. When this is done then add three parts, in weight, of pure water, and then the entire mass is to be well worked together with the water, which will slightly moisten the same. When this has been done the whole, made into the form of a brick or flat cake, is to be placed in a linen or cotton cloth and wrapped or folded up, and then pressed in a screw or other press. The cloth is then to be removed, when the mass will be like a fresh brick, slightly damp, and liable to break into several parts when handled. The whole is then to be placed in a well-dried or even slightly-heated wire sieve, and then rubbed with the hand gently back and forward, so as to force the material through the interstices between the wires in small angular, irregular grains. Immediately under the sieve is to be placed a flat-bottomed iron pan to receive the grains as they fall. When all have passed through the sieve the pan is to be placed on a porcelain or other moderately-heated stove, in order that the grains may thoroughly dry. When this is accomplished brush the grains to and fro with the feathered end of a goose-quill, and when this is done the R D D gun and mining powder is perfect and fit for use.

To prepare larger quantities a more extensive apparatus would of course be necessary.

Having thus described my invention, and the several modes in which it may be carried into effect, and the manner in which it is to be

applied in different circumstances, and the modifications necessary to adapt it to the various uses of gunpowder, mining, and blasting powder, what I claim as my invention, and desire to receive by Letters Patent of the United States, is—

The manufacture of an explosive compound

or composition of the materials and in the manner substantially as herein set forth and described.

H. HOCHSTÄTTER.

Witnesses:

AUGUST GLAESSER,  
CHARLES FRANZ.