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UNITED STATES PATENT OFFICE

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BLASTING POWDER AND METHOD OF MANUFACTURING THE SAME

No Drawing. Application filed December 26, 1929. Serial No. 416,740.

This application is a continuation-in-part of my co-pending application, Serial No. 342,955, filed February 26th, 1929.

The object of the invention is to provide an improved explosive of the nature of black powder and method of manufacturing the same. As was stated in my aforesaid application, black blasting powder is one of the most useful of explosives. It finds many important applications; sells at a lower price than practically any of the detonating explosives, but is open to the objection that it has a low strength factor.

It has, heretofore, been proposed to increase the strength factor of black blasting powder by incorporating with the same, in the usual process of manufacture, one or more of a variety of strengthening agents, such as ammonium perchlorate, potassium perchlorate, ammonium nitrate, nitro-compounds and organic nitrates.

However, most of the methods heretofore proposed, with which I am familiar, have the disadvantage of an increased hazard which renders them inapplicable to the usual black powder mills, and equipment. Some of them present the difficulty that, when incorporated in intimate contact with the usual sodium nitrate or potassium nitrate of black powder, a greatly increased hygroscopicity factor is introduced and black powder, at its best, is not of great moisture resistance.

Further, various ingredients, which might be proposed for incorporation with black powder to strengthen it, have other individual disadvantages in one or more of such items as manufacture, handling, shipment, storage and application.

Some of the objects which should, desirably, be attained or approached in making stronger black blasting powder, are: That it be adapted for manufacture in the usual black powder mills; that there be no increase in cost over usual black powder; that normal black powder safety in manufacture, handling, shipment, storage and application be maintained; that the usual methods of handling black powder, in the respects mentioned, will apply; that there be no increase in hygroscopicity; that the product possess the capability of strength regulation, and that the high temperature of combustion and the deficiency of oxygen of regular black powder be utilized to assist in increasing the strength factor.

Increased black powder strength without any, or at least without a proportional increase in cost, represents a distinct direct saving to the consumer in powder purchases. It offers further saving in less drilling, because of possible increased spacing of holes and less springing of holes because of the lack of necessity of getting so much powder in the holes, to accomplish the desired work.

This invention provides a modification of black blasting powder, which will be characterized by most of the properties and the economy of usual black blasting powder, but with various degrees of increased strength.

More specifically, it concerns the production of blasting powder consisting of intermingled particles of usual black blasting powder and specially treated ammonium nitrate, in such form that the alkali metal nitrate of usual black powder is not in such intimate contact with the ammonium nitrate as to cause increased hygroscopicity from this cause, and providing treatment of the ammonium nitrate to aid in its ready combustion or entrance into the explosive reaction.

A previously filed application of mine, (my co-pending application No. 315,106, filed October 26th, 1928) deals with grains of oxygen carrying explosive salts, as ammonium nitrate, intermingled with grains of usual black blasting powder, in such manner as to provide against the hygroscopicity resulting from intimate contact of alkali metal nitrate and ammonium nitrate, but depends solely on the reaction heat of the usual black powder to cause energy releasing decomposition of the ammonium nitrate. When the percentage of ammonium nitrate present is too high, or the explosive is insufficiently confined, this dependence may not be sufficient for best results.

I now find that I can provide for a more ready liberation of the energy of ammonium nitrate under the initiating influence of burning black powder by associating the ammo-

nium nitrate intimately with combustible and oxygen deficient matter, before mingling it with the usual black blasting powder.

A number of different ways of preparing the ammonium nitrate has been disclosed in my parent application, aforesaid, and have been generically claimed therein.

The present application is intended to cover specifically the thought of impregnating combustible oxygen deficient matter, such as sawdust, charcoal, nut-shell, etc., with a solution of ammonium nitrate, drying and granulating the resultant mass, and intermixing said mass with grains of usual black powder. The presence of the particles of oxygen deficient combustible material prevents such intimate contact of the ammonium nitrate with the alkali metal nitrate of the black blasting powder as would bring about the undue hygroscopicity which would inevitably result if the ammonium nitrate were mixed in wholly unprotected condition with the black blasting powder.

The composition formed by the impregnation of the sawdust, nut-shells, or equivalent impregnated ammonium nitrate carrier is of slow and difficult combustion and relatively low explosion temperature. However, it is potentially gas forming on decomposition and possesses excellent strength possibilities. I mix this composition in any desired proportion with alkali metal nitrate black powder. This latter material burns with great rapidity, and the development of much heat and a high temperature. These factors initiate and carry on the complete conversion of the whole product into highly expanded gas and water vapor, with a resultant high degree of blasting energy.

While I have described ammonium nitrate as being the oxygen carrying explosive salt that I preferably employ, it is to be understood that the invention contemplates the use of ammonium perchlorate in the same relation, if desired.

Further, while I have mentioned only sawdust, charcoal, and nut-shells, it is to be understood that there is a wide range of materials suitable for use in carrying out the invention. For example, it has been proposed to use as fillers, in the manufacture of dynamites, ground corn stalks, corn stalk pith, dried and ground beet pulp, and numerous other materials, usually of vegetable origin, and I wish it to be understood that the invention contemplates the use of any suitable oxygen deficient carrier adapted to take up and be impregnated by the ammonium nitrate and to enter into cooperative relation with ordinary alkali metal nitrate black powder, in the manner described in this application, and in my parent application, aforesaid.

Having described my invention, what I claim is:

1. The hereindescribed method of preparing a blasting medium, which consists of mixing with grains of black blasting powder a granular mass consisting of a vegetable product impregnated with ammonium nitrate, said vegetable product being of such a nature to enter into the blasting medium as a constituent part thereof.

2. The hereindescribed method of preparing a blasting medium, which consists of mixing with grains of black blasting powder a granular mass consisting of a vegetable product impregnated with oxygen carrying explosive salt, said vegetable product being of a nature to enter the blasting medium as a constituent part thereof and the oxygen carrying salt being of the class of ammonium nitrate and ammonium perchlorate.

3. The hereindescribed method of preparing a blasting medium which consists of mixing with grains of black blasting powder a granular mass of a suitable oxygen deficient vegetable product impregnated with ammonium nitrate, said oxygen deficient product entering into and forming part of the blasting medium.

4. A blasting medium consisting of a suitable combustible vegetable oxygen deficient material impregnated with ammonium nitrate and mixed with grains of whole black blasting powder, said oxygen deficient material entering into and forming part of the blasting medium.

5. A blasting medium comprising a carrier consisting of a suitable combustible oxygen deficient material impregnated with an oxygen carrying explosive salt and mixed with grains of whole black blasting powder, said oxygen deficient material entering into and forming part of the blasting medium.

6. A blasting medium comprising a carrier consisting of a suitable absorbent combustible oxygen deficient material of vegetable origin that is impregnated with ammonium nitrate and mixed with grains of whole black blasting powder.

In testimony whereof I affix my signature.

ROY LINDEN HILL.