UNITED STATES PATENT OFFICE.

ALFRED WOHL, OF DANZIG-LANGFUHR, GERMANY.

EXPLOSIVE.

1,406,053. Specification of Letters Patent. Patented Feb. 28, 1922.

No Drawing. Application filed June 4, 1920. Serial No. 386,533.

To all whom it may concern:

Be it known that I, ALFRED WOHL, citizen of the free city of Danzig, residing at Danzig-Langfuhr, Germany, have invented certain new and useful Improvements in Explosives, (for which I have filed an application in Germany Jan. 14, 1919,) of which the following is a specification.

The present invention relates to new explosives which contain as carbonaceous, combustible or oxidizable substance the products of polymerization of acetylene. Such insoluble and high molecular products of polymerization are formed, as is known, for instance, by the action of heat on acetylene in the presence of cuprous oxide compounds or even in the absence of copper compounds by means of silent electrical discharges on acetylene. By the action of cuprous oxide on acetylene at a temperature of about 230° to 260° C. it is possible by a continued treatment with acetylene to obtain compounds with only 0.2—0.3% copper if there is sufficient space for allowing the new formed products of polymerization to spread without choking the space. The product is therefore no definite copper compound of acetylene, but rather essentially a hydrocarbon, namely a product of polymerization of the acetylene, corresponding very nearly to the formula $(CH)_n$.

All those products are well known and form no part of the invention, the essential feature of which consists in the application of those solid high molecular polymerized products of acetylene for the preparation of explosives in combination with oxygen-carriers or combustion-supporters liberating oxygen during the detonation.

I have found, that those solid high molecular products of polymerization of the acetylene which may be termed polymerized acetylene are especially suitable for serving as combustible matter for explosive mixtures, to be applied for blasting, shooting, filling shells, cartridges and the like.

The explosives according to the present invention therefore consist of mixtures of organic or inorganic compounds which liberate oxygen during detonation with the said polymerized acetylene and other combustible substances, if so desired.

One explosive according to the present invention consists of polymerized acetylene and nitroglycerine, for instance, of one part by weight of polymerized acetylene and eleven parts by weight of nitroglycerine. Such explosives are produced by allowing the nitroglycerine to be absorbed by the polymerized acetylene. The mixture has a dry appearance and retains the nitroglycerine even by variations of the surrounding temperature. It is a very powerful explosive the amount of nitroglycerine of which may be very large when compared with kieselguhr dynamite containing generally three parts by weight of nitroglycerine and one part of weight of kieselguhr.

The new explosive mixture also possesses the advantage of the nitroglycerine carrier being combustible, whereby no heat is consumed by the inert mass of the carrier. The blasting effect is correspondingly favorable. As a matter of course, oxygen-carriers, like potassium or ammonium nitrate, chlorates or perchlorates may be added to the explosive mixture in order to attain a complete interior combustion.

Another explosive according to my invention consists of a mixture of a polymerized acetylene with nitrates, chlorates or perchlorates and is a good substitute for gun-powder, blasting powder and the like. In explosives of that class the polymerized acetylene is a substitute for finely divided carbon, soot or similar organic matter. Such explosive may consist, as an example, of polymerized acetylene, sulphur and potassium nitrate. One can also have solutions, preferably aqueous, of oxidizing salts as, for instance, potassium nitrate, ammonium nitrate, chlorates or perchlorates absorbed by the polymerized acetylene. The mixture may be dried at low temperatures. In order to facilitate the absorption of the solutions by the polymerized acetylene one may carry out the absorption under diminished pressure.

The absorption of the aqueous solution may be facilitated by the addition of substances favorizing the wetting of solid substances by liquids, as, for instance, solutions of soaps including resin, soaps, ethyl alcohol, Turkey red oil, pyridine or generally tar bases, mixtures of phenols and soaps, etc. The said substances may be added to the aqueous solutions to be absorbed or the polymerized acetylene may be moistened with the said substances before the absorption of the solutions of the oxidizing sub-

stances and then pressed out; about 10 parts by weight of aqueous saline solutions can be absorbed by 1 part by weight of the polymerized acetylene at ordinary temperatures. I may use, for instance, 0.1—0.2% of Turkey red oil calculated to the said aqueous solution. I may introduce alcohol vapors in the polymerized acetylene and then allow the aqueous solutions to be absorbed.

A further new explosive of the same kind can be produced by adding liquefied air to the polymerized acetylene in suitable proportions. A mixture of one part by weight of polymerized acetylene with 16 parts by weight or more of liquefied air has been found very suitable. Those mixtures are very good explosives, because the polymerized product is a carbon carrier of high calorific value. The explosive must be prepared in situ just before its application.

For blasting with liquefied air the flocculent products of polymerization are well suited which also possess a high absorbing capacity. They can be produced by polymerizing a small amount of acetylene in a large space.

I may also add to the mixtures of the polymerized acetylene and the oxidizing substances solid or liquid carbonaceous substances, for instance, wood carbon, saw-dust, wood petroleum, tar oils, naphthalene and so forth. I can obtain ammonium nitrate, chlorate or perchlorate powder by using the polymerized acetylene as carbon carrier alone or besides other carbonaceous substances.

Having now described my invention and the manner of carrying it out, I declare what I claim and desire to secure by Letters Patent is:—

1. An explosive comprising a mixture of solid high molecular polymerized acetylene and a combustion supporter liberating oxygen during detonation.

2. An explosive containing solid high molecular polymerized acetylene and solid combustion-supporters liberating oxygen during the detonation, substantially as described.

3. An explosive containing solid high molecular polymerized acetylene and perchlorates, substantially as described.

4. An explosive containing solid high molecular polymerized acetylene of a flocculent character and a combustion supporter liberating oxygen during detonation, substantially as described.

5. An explosive containing solid high molecular polymerized acetylene, combustion-supporters, liberating oxygen during the detonation and carbonaceous matter, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

ALFRED WOHL.

Witnesses:

SIEGFRIED HAMBURGER,
HERMANN KÜBLER.