UNITED STATES PATENT OFFICE.

LUDWIG BÄÄRNHIELM, OF STOCKHOLM, AND AUGUST FERNANDER, OF KÄRFSTA, SWEDEN.

QUICK-MATCH.

SPECIFICATION forming part of Letters Patent No. 442,164, dated December 9, 1890.

Application filed July 7, 1890. Serial No. 358,001. (No specimens.) Patented in Sweden December 3, 1889, No. 2,328.

To all whom it may concern:

Be it known that we, LUDWIG BÄÄRNHIELM, lieutenant-colonel, a subject of the King of Sweden, and a resident of Stockholm, Sweden, and AUGUST FERNANDER, engineer, a subject of the King of Sweden, and a resident of Kärfsta, county of Westernorrland, Sweden, have invented an Improved Quick-Match, (for which we have obtained a Swedish patent, No. 2,328, dated December 3, 1889,) of which the following is a specification

This invention relates to a quick-match convenient to mining and other blasting purposes, as well under as above the water, which quick-match, compared with the common one, has the advantage of giving less smoke, never missing fire, being easily ignitible, perfectly water-proof, and burning with a constant speed, which in manufacturing the quick-match may be determined within very large limits. The quick-match hitherto used for this purpose consists, as known, of a core of gunpowder or of a cotton twist impregnated with a thin paste of such powder or its constituents and of an envelope of linen, jute, or cotton yarn, or of a linen ribbon.

In the quick-match invented by us the core consists of cellulose, which has been made explosive by impregnation with nitrates and chlorates quite in the same way as in the manufacture of some explosives; but while in such manufacture of explosives as great an explosive power as possible is in view in the present invention, on the contrary, the principal aim is to obtain a quiet, uniform, and slow burning, which may be effected by supplying a sufficient quantity of oxygen and engendering as great a gas-pressure as is requisite for displacing the envelope.

According to our invention the core of the quick-match consists of a loose cotton twist of so-called "wick-yarn" boiled in a solution of chlorate of potassium and nitrate of potassium. To one kilogram cellulose is taken about 1.5 kilogram chlorate of potassium and nitrate of potassium together, however, not more than two hundred and fifty grains of the latter salt. In order to have the quick-match as free from smell and smoke as possible, there is added eight to fourteen per cent. yellow prussiate of potash, by which the free chlorine is bound. The cotton twist having thus been made explosive, it is dried carefully, submerged in a collodion bath, and then again dried, and in this way it is contracted to a very compact mass, which, being ignited, burns slowly, even as slowly as a meter in five minutes. The core thus prepared is coated with an insulating-coating of asphalt and fat oil, which, during the boiling has been mixed with salts of protoxide of manganese and talc and some sulphur, so that the mass gets a convenient hardness and becomes supple, elastic, not sticky up to +60° centigrade, and incombustible.

That cellulose may be made explosive in many ways the explosive technics have already proved; but its collodionating is, as far as we know, novel and indispensable for the purpose in view.

Having now particularly described and ascertained the nature of this invention and in what manner the same is to be performed, we declare that what we claim is—.

An improved quick-match consisting of a core of twisted cotton yarn impregated with a solution of chlorate of potassium and nitrate of potassium, to which is added yellow prussiate of potash, and coated with collodion and directly surrounded with an envelope of asphalt dissolved in linseed-oil or another fat-oil, to which likewise is added some salts of protoxide of manganese and of talc and sulphur.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

LUDWIG BÄÄRNHIELM.
AUGUST FERNANDER.

Witnesses:
NERE A. ELFWING,
JOHN EDBERG.