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UNITED STATES PATENT OFFICE.

CHRISTIAN EMIL BICHEL, OF BERLIN, GERMANY.

MANUFACTURE OF EXPLOSIVES.

SPECIFICATION forming part of Letters Patent No. 376,849, dated January 24, 1888.

Application filed November 26, 1886. Serial No. 219,862. (No specimens.) Patented in England December 17, 1885, No. 15,528.

To all whom it may concern:

Be it known that I, CHRISTIAN EMIL BICHEL, a subject of the King of Prussia, residing at Berlin, in the Kingdom of Prussia, in the Empire of Germany, have invented new and useful Improvements in the Manufacture of Explosive Substances, (for which I have obtained Letters Patent in Great Britain, No. 15,528, dated December 17, 1885,) of which the following is a specification.

Proceeding from the ascertained fact that resin-oils, and other hydrocarbons to be hereinafter more particularly referred to, are capable, when heated, of taking up a certain quantity of sulphur, which, after cooling, will be partly or entirely retained thereby, and also from the observation that the sulphureted hydrocarbons mix readily and durably with nitrous compounds such as those hereinafter more particularly designated, and that the contained sulphur causes the explosibility of the mixture by means of the detonating-fuses usually employed in the case of blasting-explosives, notwithstanding that the mixture is unsusceptible to the effect of impulses which in other cases cause the explosion of the compounds employed, and that the quantity of hydrocarbon employed in combination with nitrous compounds explosive in themselves would nevertheless destroy their explosibility, I have made use of these means for the production of cheap and harmless explosives, which are distinguished by especial susceptibility to the effect of blows or shocks. In particular, resin and linseed oils, sunflower-seed oil, oil of caoutchouc, wood and coal tar were preferred, as well as distillates of the latter whose boiling-points range between 120° and 200°, (Celsius,) and the distillates of naphtha boiling at over 250°. The constituents of coal-tar which boil at less than 120° are altogether excluded, because the melting-point of sulphur is 114°, and it appears desirable for this process to bring the sulphur to the melting-point before the hydrocarbon is converted into vapor.

In carrying out the process on one occasion one hundred parts, by weight, of resin-oil were boiled in a retort provided with a condenser, together with twenty-eight parts, by weight, of pulverized sulphur, until the sulphur was completely melted and the resin oil, at first of bright yellow color, had become brown. On another occasion the same quantities were heated in an iron retort provided with an ascension-pipe that, declining gradually and suitably, terminated in a cooled receiver, also of iron, the heating being maintained until the entire fluid mass was distilled over. No inconvenience worth mentioning was experienced in this operation. The same manipulation with a tar-oil the boiling-point of which was between 120° and 200° gave, after a short time, a dark-colored product of somewhat higher specific gravity than that of the original tar-oil. The preference was given to the distilling process over that of heating in a retort with backflow-condenser, because the product becomes cooled on the way to the receiver, and no sulphur-crystals are formed therein even when more sulphur is used in the mixture than the oil is capable of taking up. These hydrocarbons thus impregnated with sulphur exhibit the peculiarity that they mix readily with all nitrous compounds, while in the case of the products of distillation not sulphureted, even when they appear to mix, a subsequent separation takes place, which renders the production of a like product impossible. These sulphureted hydrocarbons may now be mixed directly with oxygen compounds, such as nitrous and chloric salts—seven or eight parts, for example, of nitrate of soda or potash being mixed with one part, by weight, of sulphureted resin-oil and formed into cartridges. This mixture explodes on the employment of powerful detonating-caps, but does not produce any exceptionally powerful effect.

It is advisable, therefore, to add to the permanent oxygen-carrying material—such as the nitrate of soda or potash—a nitrous compound not in itself explosive—as, for example, nitro-phenol, nitro-toluol, nitro-xylol, nitro-cumol, or nitro-benzol. Thus, if I prepare a mixture composed of one part of sulphureted tar-oil, 0.5 part, by weight, of nitro-cumol, and nine to ten parts, by weight, of nitrate of soda, I shall obtain a blasting compound of much greater effect than the previous one, and which will have the special advantage of a safe and cheap method of production, and also of a lifting or heaving effect rather than a scattering action.

The compound is employed in the form of plastic cartridges with detonating-caps. Further, the sulphureted hydrocarbons are especially suitable for admixture with nitrous compounds explosive in themselves—as, for example, nitro-aniline, nitro-glycerine, nitro-petroleum—which are ordinarily made up into the form of cartridges, with the addition of an inert porous material, such as kieselguhr, (fossil-meal.) If ten parts, by weight, for example, of nitro-glycerine are mixed with three parts, by weight, of sulphureted resin-oil, and by the admixture therewith of kieselguhr (fossil-meal) a plastic mass is produced, an explosive material is obtained which explodes more slowly than the usual blasting-explosives, and in consequence is less destructive in its effects upon the immediate surroundings of the object being operated upon, without the actual amount of work (for instance, of rock thrown down) being lessened. In addition to this advantage there is also another, that the nitro-glycerine, by the admixture therewith of the sulphureted hydrocarbon, which is completed immediately and without subsequent separation, (unlike the result obtained when unsulphureted hydrocarbons are employed,) is rendered extraordinarily unsusceptible to concussions, and consequently diminishes considerably the dangers attendant on the manufacture and subsequent employment of the material.

What I claim as new, and desire to secure by Letters Patent, is—

1. The method of making explosives which consists in distilling sulphur and a hydrocarbon in the presence of one another and adding to the resultant body an oxygen-bearing substance, substantially as described.

2. The method of making explosives which consists in distilling sulphur and a hydrocarbon in the presence of one another and adding to the resultant body nitrate of potash or equivalent oxygen-bearing substance, substantially as described.

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

CHRISTIAN EMIL BICHEL.

Witnesses:
B. ROI,
E. REITZ.