# UNITED STATES PATENT OFFICE.

JAMES CATO DE CASTRO, OF HINDE STREET, MANCHESTER SQUARE, COUNTY OF MIDDLESEX, ENGLAND.

## EXPLOSIVE COMPOUND.

SPECIFICATION forming part of Letters Patent No. 309,441, dated December 16, 1884.

Application filed January 3, 1884. (No specimens.) Patented in England August 21, 1883, No. 4,043.

*To all whom it may concern:*

Be it known that I, JAMES CATO DE CASTRO, a subject of the Queen of Great Britain and Ireland, residing at Hinde Street, Manchester Square, in the county of Middlesex, England, doctor of medicine, have invented certain new and useful Improvements in the Manufacture of Explosive Compounds, (for which I have obtained a patent in Great Britain, No. 4,043, bearing date August 21, 1883,) of which the following is a specification.

The object of my invention is the manufacture of explosive compounds that shall be practically free from danger not only during the process of such manufacture, but also practically so during transit and storage; also, that the pellets or agglomerated forms of such compound shall not be either hypersensitive to percussion or ignition, and shall not be explosive, in the true sense of the word, unless purposely and strongly confined, while at the same time such compounds shall not be liable to undergo chemical change from variations of temperature, damp, or such like causes of deterioration pertaining generally to explosive compounds. For this purpose I mix with wheaten or other bran which has first been deprived of its flour or starch by washing or cleansing and subsequent drying, or other suitable description of cellulose, tersulphide of antimony, or natural sulphide of antimony, in the proportion of, say, about one part of the tersulphide of antimony to about seven parts of the bran or other cellulose. These ingredients are thoroughly incorporated together in a mixing-mill or revolving drum or other convenient mixer. A saturated or nearly saturated solution of chlorate of potash is then added and the whole is well stirred or compounded together, so as to form a wet mass. This mass may then be made into suitable pellets or agglomerated forms, of size and shape best adapted for use, and dried in the usual manner. The quantity of chlorate of potash I employ is in proportion about equal to the weight of bran and tersulphide of antimony combined. These pellets or forms of the explosive compound are generally hollowed or perforated about half-way down the center, or are otherwise so formed as found best adapted to promote combustion. These explosive forms of compounds such as described may be fired by means of an ordinary detonating or explosive cap, thereby dispensing with the necessity for "tamping"—a troublesome, uncertain, and otherwise objectionable and often dangerous operation.

The pellets or forms of my explosive compounds may, when dried, be placed in strong water-proof cartridge cases or covers. These cartridge cases or covers may be made of a suitable description of paper, which, after being wrapped around the cartridge or mass of explosive compound, it is advisable to dip into paraffine-wax or other suitable preservative coating. By such treatment the explosive is further insured against ill effects of damp being contracted from the atmosphere or otherwise, and its employment for explosive purposes in wet rocks or even under water rendered certain, while such incasing renders the explosive compound even less liable to injury during transport, storage, or application preliminary to actual use as an explosive or disruptive agent.

In some cases it may be found useful to manufacture smaller-sized pellets or forms, which may be called, for distinction, "primer-pellets," and these have a hole formed through them. These primer-pellets may in use be placed one on each of the larger pellets, and the igniter would then be placed on or applied to the primer-pellet, so that on ignition the flame can pass down the primer-pellet into the larger one to effect the combustion the more readily and surely.

Among the advantages attendant on the use of explosive compounds according to my improvements are economy of manufacture and material, the avoidance of danger in handling and storage or transit, as well as during the manufacture, greater explosive effect in use, facility afforded by the capability of the explosive compound being ignited by means of ordinary caps as igniters, the necessity for tamping being dispensed with, and general simplicity attendant on the manufacture and use. Bran and chlorate have been used together as an explosive, as also have cellulose, (in the form of rye-flour,) chlorate, and an-

timony with other ingredients not used by me. These, therefore, I do not claim.

Having thus described the nature of my said invention and the manner of carrying the same into practical operation, I would have it understood that what I claim is—

The described explosive compound, consisting of bran or other suitable form of cellulose mixed with tersulphide of antimony or natural sulphide of antimony, in the proportions substantially as set forth, and to which mixture is added a saturated or nearly saturated solution of chlorate of potash, and the whole formed into agglomerated pellets or grains, as set forth.

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

JAMES CATO DE CASTRO.

Witnesses:
ALFRED DONNISON,
JOHN ALFRED DONNISON.