

UNITED STATES PATENT OFFICE.

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DYNAMITE AND PROCESS OF MAKING THE SAME.

SPECIFICATION forming part of Letters Patent No. 333,348, dated December 29, 1885.

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To all whom it may concern:

Be it known that I, JOHN C. SCHRADER, of McCainsville, in the county of Morris and State of New Jersey, have invented certain
5 new and useful Improvements in Explosive Compounds and in the Manufacture thereof; and I do hereby declare that the following specification is a clear, true, and complete description of my invention.

10 My invention involves the use of nitro-glycerine; and my object is to produce a dry-grained free-running powder containing small but effective proportions of nitro-glycerine.

The main feature of my invention is based
15 upon a discovery made by me that better results can be obtained with low-grade powders if only a portion of the granular base or dope be heavily charged with nitro-glycerine and employed in various proportions with un-
20 charged combustible and gas-producing granular matter than if the entire mass of granular matter were charged with the same quantity of nitro-glycerine. In both cases the percentage of nitro-glycerine would be the same;
25 but in the one case the liquid explosive will be massed in a highly-effective quantity in each of the charged grains, and in the other case it will be so distributed in all the grains as to greatly impair its detonating capacity.

30 Broadly stated, the main feature of my invention consists in charging absorbent grains or granules, whether combustible or non-combustible, with a percentage of nitro-glycerine higher than is employed in low-grade high
35 explosives, and then mixing said charged grains with uncharged dry combustible grains in such proportion as will so far reduce the percentage of nitro-glycerine in the mass as to cause the resulting compound to be a dry-
40 grained low-grade high explosive of such particular efficiency as may be desired in each case.

It will be obvious that powder composed of
45 charged grains compounded or mixed with dry uncharged grains must of necessity possess a greater free-running capacity than would be the case if all the grains were charged with the liquid explosive, and that is one important object sought by me, thereby enabling my
50 powder to be used with the same facility as any ordinary black blasting powder.

As to the grains or granules which are to be charged with nitro-glycerine, it is to be understood that they can be widely varied in their character and composition without de-
55 parture from my invention. As hereinbefore stated, they may be either non-combustible or combustible; but the latter is obviously preferable. Said grains must also be capable of taking up and housing effective quantities of
60 nitro-glycerine, seldom if ever less than, say, ten per cent., and from that to as high as, say, sixty or seventy-five per cent. Said grains should be coarse, and seldom, if ever, smaller than would be screened by a twelve-mesh sieve. 65

As a suitable non combustible grain or granule to be thus charged infusorial earth is employed, in which case it is prepared as heretofore for use in dynamites by baking it in
70 cakes; but instead of grinding it, as heretofore, it is granulated and screened by me. Such grains should be charged with as high as, say, sixty to seventy-five per cent. of nitro-glycerine.

The combustible grains to be thus charged
75 can be of various kinds and variously formed and compounded without departure from my invention—as, for instance, such as are composed of a nitrate, sulphur, and carbonaceous matter. I prefer to use a novel dope invented
80 by me, and which constitutes the subject of a separate application for Letters Patent. This grained dope is composed of nitrate of soda, carbonaceous or woody matter, and sulphur, these ingredients being compounded and heat-
85 ed, the sulphur being thereby melted, and in such proportions that it constitutes when cold a cellular housing for the other ingredients in each grain, and such grains are capable of absorbing and fully housing from ten to forty
90 or fifty per cent. of the liquid explosive.

Another variety of grain suitable for charging may be composed of a nitrate, sulphur, and charcoal, or other carbonaceous matter, compounded by the well-known wet process, special
95 attention being given to producing grains of great absorbent capacity—as, for instance, by avoiding high pressures in forming cakes, and also avoiding undue glazing. In mixing such wet-process compounds a small percentage of
100 sugar may be added for securing a firm grain without impairing its permeability.

As to the dry grains with which said charged grains are to be mixed in accordance with my invention it is to be understood that they may also be widely varied without departure from my invention. Said dry grains to be within my invention must, however, be combustible. Said grains should be coarse and seldom, if ever, finer than would be screened by a twelve-mesh sieve, and it is immaterial whether they are absorbent or non-absorbent of the liquid explosive.

I prefer to use for the dry grains my novel dope, as hereinbefore described; but the wet-process grains also, hereinbefore described, can be employed as dry grains with good results, and in many cases it is desirable to employ ordinary black powder.

In preparing one particular variety of my novel powder, composed in part of the non-combustible charged grains, I proceed as follows: For producing a five per cent. powder I charge one and two-thirds pounds of non-combustible grains with five pounds of nitro-glycerine, and then mix the same with ninety-three and one-third pounds of dry combustible grains. In this case the non-combustible grains should not be unduly large, so that they can be of greater number, and consequently well distributed throughout the mass. I deem it impracticable to use non-combustible grains charged with less than, say, sixty per cent. of the liquid explosive; but with my novel dope from, say, ten to forty per cent. of nitro glycerine can be employed.

In preparing another variety of my novel five per cent. powder composed of said novel dope charged with, say, twenty-five per cent. of nitro-glycerine, I take fifteen pounds of said dope charged with five pounds of the liquid explosive and mix the same with eighty pounds of the same dry dope.

The wet-process grains specially prepared with reference to their absorbent capacity, as hereinbefore described, can be relied upon for holding the nitro-glycerine in substantially

similar proportions as my novel dope, and therefore those grains charged with the liquid explosive should be used substantially as described in connection with said novel dope.

It will be seen that the percentage of liquid explosive in the charged grains, and that the proportions of charged grains to uncharged grains may be almost indefinitely varied without departure from my invention, and also that the dry grains may or may not have been specially prepared for my purposes—as, for instance, if the dry grains were common black powder, I obtain a very efficient and desirable five-per cent. nitro-glycerine powder by charging forty-five pounds of my novel dope with five pounds of the liquid explosive and mixing the same with fifty pounds of the common black powder.

Although I have specially referred to five-per cent. powders, it is obvious that higher grades will only involve obvious changes in proportions of the charged and uncharged grains employed, governed by the proportions of the liquid explosive housed within the charged grains.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The process of manufacturing dry-grained free-running high-explosive compounds, substantially as hereinbefore described, the same consisting, first, in charging absorbent granular matter with nitro-glycerine; and, secondly, in mixing said charged granules with dry combustible grains or granules in quantity sufficient to so far reduce the percentage of nitro-glycerine in the mass as to produce a low-grade powder, as set forth.

2. The low-grade dry-grained free-running powder, composed of absorbent grains charged with nitro-glycerine and dry combustible uncharged grains, substantially as described.

JOHN C. SCHRADER.

Witnesses:

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FRANK F. HUMMEL.