

UNITED STATES PATENT OFFICE.

JOHN C. SCHRADER, OF McCAINSVILLE, NEW JERSEY, ASSIGNOR OF ONE
HALF TO RUSSELL S. PENNIMAN, OF JENKINTOWN, PENNSYLVANIA.

DYNAMITE.

SPECIFICATION forming part of Letters Patent No. 333,346, dated December 29, 1885.

Application filed June 2, 1884. Serial No. 133,616. (No specimens.)

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 High Explosive Compounds; and I do hereby declare that the following specification is a clear, true, and complete description of my invention.

So far as my knowledge extends, I am the
10 first to invent and produce dry-grained, high-grade nitro-glycerine powders, and although they are made by me in various grades, and containing from ten to forty per cent. of the liquid explosive, they are not so adversely
15 affected by low temperatures as ordinary dynamites, and they are safe in handling and in transportation. My novel powders, being dry-grained, can be as readily and conveniently employed as ordinary black blasting-powders
20 in all connections where a free-running powder is deemed desirable.

The subject hereinafter described and claimed is a dry-grained, free-running nitro-glycerine powder of high grade, containing a
25 natural absorbent; and my invention consists in a novel compound of nitro-glycerine with hard grains or granules capable of housing and internally retaining large proportions of the liquid explosive, because of the presence
30 in said grains of wood pulp or other fibrous vegetable matter serving as a natural absorbent, and also because said grains are composed in part of sulphur so disposed as to constitute as the main part of each grain a hard or friable cellular structure, capable with the pulp
35 of great capillary absorption and of effectually resisting the softening influences of the nitro-glycerine.

In the production of my compound I deem
40 wood pulp preferable to any other vegetable fibrous matter, although cotton lint, cellulose, sawdust, straw, and many other well-known and analogous fibrous vegetable bodies may be employed without departure from my in-
45 vention.

My grains are compounded substantially as follows: wood pulp, twelve (12) parts; sulphur, twenty (20) parts; nitrate of soda, sixty-eight (68) parts. These ingredients, in a finely-ground
50 condition, are well mixed and heated until the

sulphur melts, whereupon the mass is stirred while cooling, and thereby developed into grains or granules; or, while still soft, the said compound is pressed lightly into cakes, and thereafter grained, as with machines for grain-
55 ing black powder. The grains thus developed should be as uniform in bulk as may be practicable, and they should seldom be smaller than could be screened through a twelve-mesh sieve or larger than through a four-mesh
60 sieve, and it is sometimes desirable that the grains be graded by screening. Grains thus produced are then charged with nitro-glycerine, within their capacity to receive and internally retain therein the liquid explosive.
65 If powder of high grade is desired, said grains are charged with, say, forty per cent. of the liquid explosive, and any lesser proportion thereof may be employed for producing pow-
70 ders of lower grades.

The proportions of the several ingredients named may be varied without departure from my invention, provided there be sufficient sulphur, when melted, to thoroughly control
75 the fibrous matter and to mass it and the nitrate into friable cellular grains; but such an excessive proportion of sulphur should be avoided as would result in secluding too much of the fiber from absorbent contact with the liquid
80 explosive, and thereby prevent the housing of an effective proportion thereof in each grain.

While the use of nitrate of soda is in every way desirable, it is obvious that if other equivalent salts be employed, or even if the nitrate be omitted, the grains will nevertheless pos-
85 sess their novel cellular characteristics and be capable of taking up and retaining large quantities of the liquid explosive, and can be relied upon for effective service. The addition of other ingredients than those mentioned can
90 also be made without departure from my invention if each grain contains the fibrous matter and has its cellular structure of sulphur; but no additional ingredient should be employed which will so plug up or seal the cells
95 or pores of the grains and so insulate the fiber against absorption as to defeat the object of my invention.

It is to be understood that the grains herein described are in one of several forms of novel
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"dope" invented by me, which constitute the subject of a separate application for Letters Patent; also, that the process of manufacturing the powders herein described, as well as other
5 analogous varieties of my novel powders, constitute the subjects of separate applications filed by me.

Having described this portion of my invention, I claim as new and desire to secure by
10 Letters Patent—

The dry-grained explosive compound, sub-

stantially as hereinbefore described, containing nitro-glycerine housed and retained within hard cellular grains, composed in whole or in part of a cellular mass of sulphur and fibrous vegetable matter, substantially as described, and capable of resisting the softening influences of the liquid explosive.

JOHN C. SCHRADER.

Witnesses:

JAS. H. NEIGHBOUR,
FRANK F. HUMMEL.