

# UNITED STATES PATENT OFFICE.

FIN SPARRE, OF WILMINGTON, DELAWARE, ASSIGNOR TO THE E. I. DU PONT DE NEMOURS POWDER COMPANY, OF WILMINGTON, DELAWARE, A CORPORATION OF NEW JERSEY.

## COMPOSITION FOR RAILROAD-TORPEDOES.

No. 850,406.

Specification of Letters Patent.

Patented April 16, 1907.

Application filed December 21, 1905. Serial No. 292,814.

*To all whom it may concern:*

Be it known that I, FIN SPARRE, a subject of the King of Sweden, residing at Wilmington, county of Newcastle, and State of Delaware, have invented a new and useful Improvement in Composition for Railroad-Torpedoes, of which the following is a full, clear, and exact description.

The object of my invention is to produce a railroad-torpedo or railway fog-signal that will be free of the defects characterizing those heretofore known.

The ordinary railroad-torpedo often fails to give a report that is sufficiently loud and sharp for signaling purposes, its composition is frequently dangerous, and it deteriorates or becomes insensitive when put on the tracks in damp or rainy weather, owing to absorption of moisture.

Specifically the object of the invention is to produce a torpedo that will be free of all of these objections.

Another object of the invention is to provide a more effective substitute for ground glass, pebbles, and like materials, which are added to increase friction when hit by the exploding means, which substitute will not only give great frictional heat, but will be otherwise also an active component of the composition. The invention is also applicable to caps, detonators and similar explosives.

My invention consists in a composition containing chlorate of potash, sulfur, a coating mixture, and ferrosilicon, preferably in the proportions hereinafter specified.

The following compositions are examples of compositions embodying my invention: thirty to seventy per cent. chlorate of potash, preferably fifty per cent.; ten to forty per cent. sulfur, preferably twenty-five per cent.; five to twenty-five per cent. coating mixture, preferably fifteen per cent.; twenty per cent. or less ferrosilicon, preferably ten per cent.

The coating or indurating mixture is preferably that set forth in my application filed October 24, 1905, Serial No. 284,152—that is, nitrocellulose dissolved in a liquid mononitro compound of an organic hydrocarbon (such as mononitrotoluol) in which preferably a small quantity of a higher nitrated solid nitro compound (such as trinitrotoluol) has

been dissolved. Different degrees of sensitiveness may be obtained by changing the percentage of this mixture in the composition. Other oxygen carriers, such as other chlorates and perchlorates may be used. The ferrosilicon should be in finely-divided or comminuted form.

To the above composition I prefer to add coarse-grained ferrosilicon, preferably not ground finer than bird-shot, and it may be much coarser. If the coarse ferrosilicon is employed, the fine ferrosilicon may be omitted altogether; but this is not preferred.

In preparing the explosive the chlorate is first mixed with the sulfur. The mixture is then incorporated with the gelatinous coating material. To the resultant mixture is added the ferrosilicon. If both fine and coarse ferrosilicon are employed as ingredients, the fine ferrosilicon is first incorporated with the chlorate, sulfur, and coating ingredient, as described, and then the coarse ferrosilicon is added, which may constitute as much as fifty per cent., but preferably should be about twenty per cent., of the composition. If the fine ferrosilicon alone is used, ground glass, pebbles, or other well-known friction-increasing materials may be added.

In the foregoing composition the sulfur and the comminuted ferrosilicon are both combustible substances, the sulfur readily igniting and producing a moderate degree of heat and the ferrosilicon producing a very high degree of heat, but igniting much less readily. I prefer to employ both of them together, for the reason that together they are much more effective than either alone, probably because the sulfur in igniting quickly ignites the ferrosilicon, thus producing a compound substance that has the advantage of ready ignition combined with a high degree of heat. The coarse-grained ferrosilicon takes the place of pebbles, ground glass, and like substances heretofore used in railroad-torpedoes. It is superior, however, to these substances, as it combines with hardness extreme brittleness and produces by the breaking down of its particles great friction, and hence a high degree of heat, to produce the reaction between the elements of the explosive proper.



Torpedoes embodying my improved composition are much safer than other torpedoes. Most of them need percussion-caps. It is evident that exploding charges with caps inserted are dangerous. My composition does not require caps.

Having now fully described my invention, what I claim, and desire to protect by Letters Patent, is—

10 1. An explosive composition containing chlorate of potash, sulfur, a coating substance and ferrosilicon.

2. An explosive composition containing chlorate of potash, sulfur, a coating substance, and ferrosilicon in comminuted form.

3. An explosive composition containing chlorate of potash, sulfur, a coating substance, and coarse-grained ferrosilicon.

4. An explosive composition containing chlorate of potash, sulfur, a coating substance, ferrosilicon in comminuted form, and coarse-grained ferrosilicon.

5. An explosive composition containing chlorate of potash thirty to seventy per cent., of sulfur ten to forty per cent., of a coating substance five to twenty-five per cent., and

of ferrosilicon, in comminuted form less than twenty per cent.

6. An explosive composition containing chlorate of potash, ferrosilicon, and a coating composition consisting of a liquid nitro compound containing in solution a normally solid nitro compound and nitrocellulose.

7. An explosive composition containing chlorate of potash, sulfur, and a coating composition consisting of a liquid nitro compound containing in solution a normally solid nitro compound and nitrocellulose.

8. An explosive composition containing chlorate of potash, sulfur, ferrosilicon, and a coating composition consisting of a liquid nitro compound containing in solution a normally solid nitro compound and nitrocellulose.

In testimony of which invention I have hereunto set my hand, at Philadelphia, on this 19th day of December, 1905.

FIN SPARRE.

Witnesses:

M. M. HAMILTON,  
THORNLEY B. WOOD